Working Memo 851

Date: February 7, 2002

To: Division of Drinking Water Staff

Through: Robert B. Taylor, P. E., Director
Division of Drinking Water

From: G. W. Peaks, P. E., Director of Technical Services
Division of Drinking Water

Subject: Water - Procedure - Surveillance - Sanitary Surveys

Delete: Working Memo 673

I. Definition - A sanitary survey may be defined as an evaluation of operational and maintenance procedures and a review and inspection of water sources, facilities, and equipment of a waterworks. DDW has traditionally carried out sanitary surveys consistent with USEPA's definition of a full, complete sanitary survey as one that provides a comprehensive, accurate record of a waterworks' components, an assessment of the waterworks' adequacy and operating conditions, and a determination of whether previously noted deficiencies have been corrected. Such a survey includes review and investigation of various elements, as follow:

* Waterworks' past sanitary surveys
* Waterworks' past water monitoring results
* Construction of water source(s)
* Sources of contamination
* Watershed/Recharge area management
* Water treatment processes
* Water distribution system
* Cross-connection control program
* Waterworks' management
* Waterworks' operation
* Operating staff's water monitoring/reporting procedures
* Qualifications of operating staff
* Collection of water samples
* Corrective actions/recommendations from previous surveys especially significant deficiencies

DDW believes that all of these elements are necessary for a thorough survey, but recognizes that not all elements may be necessary or evaluated at each survey. This is particularly true when surveys are conducted at very frequent intervals. Many of the elements, however, need to be evaluated at every survey. All elements must be evaluated within a three-year cycle .

II. Purpose - The main purpose for performing sanitary surveys is for assisting the waterworks' operator/owner in the production and distribution of safe drinking water. An additional reason for performing sanitary surveys is that periodic surveys develop lines of communication between the Division and the waterworks' operator/owner, which can enhance relationships and foster mutual trust and respect.

III. Frequency of Surveys - The following minimum sanitary survey frequency shall be used:

a. Groundwater – (C, NTNC and state/federal TNCs) one survey each 18 months
Groundwater – (TNCs) one survey each 24 months

EXCEPTION: For Federal Government owned, remotely located pitcher pump waterworks, the sanitary survey shall be once every five years.

b. Groundwater source under the direct influence of surface water - shall be considered a surface source for the purpose of scheduling sanitary surveys.

c. Surface – two surveys each year (includes waterworks with surface source in whole or in part).

d. Consecutive – at the groundwater frequency.

IV. Sanitary Survey Format for Groundwater Systems - The attached sanitary survey report form (Appendix A) is for use in conducting and reporting the results of groundwater sanitary surveys. This form is generally appropriate for GUDISW with the addition of site specific treatment forms.

The form has been designed to 1) provide uniformity of surveys, 2) ensure completeness of the surveys, 3) facilitate recordkeeping, 4) allow follow-up surveys by other staff if necessary, 5) provide owners/ operators with a separate and concise notification of deficiencies, 6) motivate owners/operators to take corrective action, and 7) provide a record for future surveys, for emergency situations, or when technical assistance is needed. **If these forms are modified you must ensure that the mandatory fields in the General Information section are included.**

A. Part I - General Information

1.) Purpose - the purpose of this section of the sanitary survey report is to provide the following information:

a.) General Information
b.) Compliance History
c.) Monitoring History

The top portion of the "General Information "through "Present at Survey" is mandatory information while the remaining items are general items which should already be included in the description sheet. "Compliance History" and "Monitoring History" are self-explanatory and should be completed and updated for all routine sanitary survey reports.

2.) Intent - the intent of this section is to provide an "in-house" cover sheet for the sanitary survey report. These sheets will appear in the file with all other documents and notes associated with the survey for each survey performed.

This section will be an integral part of the pre-survey file review. It should serve as a reminder of any recent problems and/or any outstanding requirements for the waterworks. Also, the reviewer will use this section during the final review of the completed sanitary survey report, before the "Recommendations" section is sent to the owner. This section is not intended to be sent to the waterworks owner because most of the information will be of no real value to him/her.

The owner's report from the previous survey should be copied and included in the current sanitary survey documents as a work sheet for the staff conducting the current survey.

B. Part II - System Survey Information

This portion of the report is intended to be used during the onsite review of the water source, facilities, equipment, operation, and maintenance of the waterworks for the purpose of evaluating the adequacy of such source, facilities, equipment, operation, and maintenance for producing and distributing safe drinking water. The task is to identify potential or existing problems and evaluate their risks.

The lists presented are intended to be used as a tool. The lists are not checklists for conducting a thorough waterworks evaluation. The lists are provided as reminders of the topics to be evaluated during a survey. The intent is to place numbers in boxes where comments are required and to write the comments at the bottom of the page or on another sheet, which can be included with the report.

The page is designed to evaluate two sources, storage tanks, etc., and should be suitable for the majority of waterworks. If more than two sources, tanks, etc. are present in a waterworks; additional copies of the page should be used and taken into the field by the staff.

The items in the "Source (s)" list are arranged generally in an order to consider potential health threats first, followed by physical equipment required by the Waterworks Regulations, and finally, operational items. Items in the "Well House" and "Storage" lists are arranged in a similar order.

In cases where treatments other than those included here in are present, the staff will need to develop their own process specific list(s) for inclusion in the survey report. The list (s) should follow the general format of that for fluoridation including a review of the past 12 months monthly operation reports to determine effectiveness of treatment, questions pertaining to potential health threats (usually cross-connection control), physical facilities required by the Waterworks Regulations, and operational considerations. The staff should consult with the Deputy Field Director to assure that the pertinent items are included in the lists).

Staff are encouraged to consider the preparation of piping diagrams or schematics where such information is not available in the correspondence file. Such information can be valuable to the staff in finalizing the survey report and will provide an important future reference source.

During the entire survey, the staff should observe, note, and evaluate conditions that may bring about impairment in the quality of water to be delivered to the consumer or that may impair the reliability of the waterworks to deliver safe drinking water. The staff should question the operator thoroughly in order to evaluate the operator's knowledge of potential sources of contamination within the waterworks and within 1000 feet of the source, the operator's knowledge of the waterworks and its treatment processes, the operator's ability to reliably operate the waterworks, operator attention paid to process control and maintenance, and the administration and financial capability of the waterworks to assure proper operation. These observations should be written (on a separate sheet or the back of one of the working sheets) and made a portion of the survey.

C. Owner's Report - The final portion of the sanitary survey report is the report to the owner. This part of the overall survey form has been designed to include only the information which is deemed pertinent to the party who has the authority and responsibility to react to the recommendations for corrective action. This portion of the overall report is envisioned as the only record of the sanitary survey to be provided to the owner and local health department. The report has been tailored to stand on its own with minimal background information, including date and type of survey and a listing of those in attendance, provided for those instances when the "owner" was represented by another party for the survey.

The performance of field tests such as pH, alkalinity, hardness, iron, manganese, etc. should be considered during all surveys. The conducting of field tests may be indicated when routine chemical samples are collected, during a complaint investigation, when requested by the owner/operator, or for the purpose of evaluating a treatment process. The results of all field tests conducted shall be included in the comment section of the owner's survey report.

Realizing that everyone has a different style, the form of presentation of the staff recommendations, comments, observations, concerns, compliments are left to the discretion of the staff and/or their supervisor. Obviously, we must present the results of our survey in a thorough and understandable manner. Our report must be prepared and forwarded promptly following the sanitary survey in order that the owner is given the impression of professionalism on our part which in turn should foster confidence and a willingness to cooperate towards a mutual goal, safe drinking water. The report can be brief or as detailed as necessary, with extra sheets added for narrative if needed, to convey to the owner the deficiencies that exist and what must be done to correct them. The report must reiterate those areas requiring action by the owner that you discussed with the owner/operator during the sanitary survey. If the written report differs from the on-site discussion during the survey, the owner/operator must be phoned to notify of the change (s) and the reason (s). Our report must be communicated at the level of the owner/operator, with laymen's language used where the need dictates. The likelihood that corrective action will be undertaken by the owner in a timely manner will be strongly influenced by understanding the reason(s) for doing what we request. By taking the time to describe the problem in simple terms and by explaining the reasons for requiring the correction, we will normally receive a more positive response.

Since our survey includes the complete water system, the total picture must be considered before possible causes of problems are communicated to the owner. The reason for this is that problem causes may exist throughout the system rather than resulting from a single isolated circumstance. Problem solving must be approached systematically with a concept of the elements that might contribute to the problem and insights into possible solutions. Only after a thorough evaluation of all system components is completed, should recommended actions be documented to the owner/operator.

Finally, the staff member making the survey must temper any recommendations with a thorough realization of their experience level, previous training, and knowledge of the problem. Erroneous instructions, based upon a misinterpretation of the actual situation, can have damaging consequences. Any staff with limited experience or simply unable to confidently interpret the survey results, must use good judgement by referring the suspected problem to more experienced Department personnel for resolution.

V. Sanitary Survey Format for Surface Water Systems – The attached sanitary survey report forms (Appendix B & C) are for use in conducting and reporting the results of sanitary surveys performed at waterworks served by surface water plants.

The forms have been designed to 1) provide uniformity of surveys, 2) ensure completeness of the surveys, 3) facilitate recordkeeping, 4) allow follow-up surveys by other staff, 5) provide owners and operators of the waterworks with a detailed record of the surveys, 6) provide a record for future surveys, and 7) provide owners/operators a specific, detailed listing of deficiencies, comments, and recommendations. **If these forms are modified you must ensure that the mandatory fields in the General Information section and the Significant Deficiency items (≥10,000) are included. The top portion of the "General" section through "Present at Survey" is mandatory information.**

This report form is designed to cover both performance of the physical facilities themselves and the operational and managerial institutions, which govern the facilities. The purpose of the form is to provide a means to look at the necessary unit processes at the treatment plant and at associated facilities elsewhere, and to look at the programs which need to be in place to ensure proper operation, maintenance, planning and funding of those facilities on an on-going basis. It is intended that Part A of the form will be completed on **each** visit to the plant. It is intended that Part B would be completed at least every 1 ½ years (twice every 3 years), and that Part C would be filled out at least once every 3 years. Use of the periodic sections of the form will allow VDH staff to conduct a sanitary survey of the entire waterworks, which would meet the definition of a "full, complete sanitary survey" and the Federal regulations which call for a sanitary survey of this type once per three years for community waterworks. (For non-community waterworks you may substitute in Part B and C above based on a five-year cycle).

The forms are intended to be used by the DDW staff member making the on-site visit for the purpose of evaluating the operating and institutional adequacy of the waterworks. The tasks are to identify existing or potential problems and to evaluate the risks presented by those problems. The items found in the forms are not intended to be all-inclusive, but are a good starting point for observation and discussion with the operating staff and managers.

During the survey our staff should courteously and thoroughly question the operating staff to determine their knowledge of the facility and its processes, the staff's ability to reliably operate the waterworks, and the attention paid to process control and maintenance. The long-term performance of the facility should receive special attention. Notes should be kept on the form, with special comments made in the section provided for that use in each unit process. Performance of field tests is encouraged, and results of those tests should be entered in the "Comments/Recommendations for Action" section, which is the last page of the opening/summary section of the report.

It is envisioned that the whole report form [the opening/summary section, and Parts A, B, and C (depending on which areas of the survey are performed)] will be forwarded to the waterworks owner and to the Operator in Responsible Charge (OIRC). It is believed that owners of surface waterworks' want to see a full record of our survey, and will appreciate having the unit-by-unit evaluation contained in the report. The report may be finalized as a hand-written document **if** completed neatly and legibly. Otherwise, it will need to be re-done and prepared as a typed/printed document.

VI. Distribution of Sanitary Survey Reports – The original copy of each report (full copy for surface waters; owner's letter for groundwater and consecutive systems) is to be sent to the waterworks owner and to the OIRC. [A model transmittal letter (Appendix D) must be utilized when there are Significant Deficiencies (Surface≥10,000).] For all federally-owned waterworks, a copy of the opening/summary section of the report or the owner's letter is to be mailed by the field office to:

Federal Facilities Coordinator
USEPA – Region III
841 Chestnut Building
Philadelphia, PA 19107

The DDW – Technical Services section only needs a copy of the opening/summary section (not any of the three Parts) of the surface water report. For groundwater and consecutive systems, DDW is to be sent copies of the letter to the owner and the worksheets.

A special copy of the owner's report (owner's letter or opening/summary section) **plus** only the appropriate evaluation sheets (unit process review sheets) for fluoridation systems shall be sent to the Division of Dental Health for **all** waterworks which practice fluoride adjustment, whether groundwater or surface water. The copy shall be sent to:

pc: VDH – Division of Dental Health (Attn: Director)

All sanitary survey reports shall be written, reviewed, and sent out of the Field Office within 30 calendar days of the survey.

VII. Significant Deficiencies –This Section applies only to surface water source waterworks serving a population equal to or greater than 10,000 and is effective January 1, 2002. The following eight categories: Source; Treatment, Distribution and Transmission; Finished Water Storage; Pumps, Pump Facilities and Controls; Monitoring, Reporting and Data Verification; Waterworks Management and Operation; and Operator Compliance with State Requirements, have deficiencies that are considered significant. Specific deficiencies initially considered significant are identified on the sanitary survey form. If a staff member performing a sanitary survey observes one of these deficiencies, concurrence must be obtained from the Deputy Field Director prior to formal notification to the waterworks owner. The observed deficiency shall be subject to the following questions in order to confirm that it is a significant deficiency:

- Does the deficiency cause the potential for acute and chronic contaminants to be introduced into the drinking water?
- If left uncorrected will the deficiency cause the potential for the introduction of acute and chronic contaminants into the drinking water at some point in the future?
- Does the deficiency affect treatment in an unacceptable manner?

The owner is required to respond no later than forty-five days after receipt of the survey report indicating how and on what schedule the significant deficiencies will be addressed. All references to the required date of response should be sixty days from mailing. A tracking system must be developed to ensure that the above schedule is met and that the significant deficiencies are corrected. Failure on the part of the owner to comply will institute enforcement action through our enforcement/compliance procedures.

VIII. Staff Training – Training of the staff is required to assure the quality and consistency of the sanitary survey program. The staff training program shall 1) provide the basic knowledge to allow new staff to adequately perform sanitary surveys, 2) address criteria to serve as a guide as to the appropriate actions to be taken when specific types of deficiencies are detected to insure deficiencies are evaluated consistently, and 3) address the format as to how surveys should be conducted and documented.

SUGGESTED TRAINING APPROACH FOR SANITARY SURVEYS

The training of the staff should consist of a combination of formal classroom training and on-the-job training.

A. Classroom Training

1. Training subjects

a. Determination of vulnerability

b. Identifying cross-connections

c. Types of construction and appurtenances including a discussion of purpose of each type.

d. Exposure to different types of treatment processes, i.e., disinfection, coagulation, filtration, iron and manganese removal, softening, fluoridation, etc.

2. USEPA-sponsored sanitary survey training course should be modeled

3. Distribute informational/reference materials

4. Include a slide presentation that depicts interesting field conditions

B. On-The-Job (field) Training

1. Applicable to new staff

2. Duration dependent upon the new staff 's prior experience.

APPENDIX A

VIRGINIA DEPARTMENT OF HEALTH
DIVISION OF DRINKING WATER
GROUNDWATER SYSTEM SANITARY SURVEY REPORT

SUBJECT:_____
Water - _____
PWSID No. _____

PART I - GENERAL INFORMATION

Owner: _____ Contact Person _____

Telephone: _____ Type Waterworks ( ) C ( ) NTNC ( ) TNC

Survey By: _____ Survey Date: _____

Time Spent On-site: _____ Last Survey Date: _____

Survey Type: ( ) Routine ( ) Complaint ( ) Special: _____

Present At Survey: _____

Waterworks Class: _____ Operator's License Class: _____

Date To D.E.: _____ Reviewed By / Date: _____ / _____

Date To D.F.D./TSE/E.I.S.: _____ Reviewed By / Date: _____ / _____

Facilities Surveyed: _____

Permit Effective Date: _____ Permit/Description Sheet Up-to-Date ( ) Yes ( ) No

No. Connections: _____ Pop. Served: _____ Avg. Daily Usage: _____

Design Capacity: _____ Operating Within Design Capacity ( ) Yes ( ) No

Average GPD/Connection: _____ Inventory/SDWIS Records Up-to-Date ( ) Yes ( ) No

COMPLIANCE HISTORY

Operations staff has proper license and is adequate to staff facility ( ) Yes ( ) No
Cross-Connection Program Approved ( ) Yes (Date: _____) ( ) No
Reviewed Records This Visit ( ) Yes ( ) No Satisfactory ( ) Yes ( ) No Program Active ( ) Yes ( ) No
Bacteriological SSR Approved ( ) Yes (Date: _____) ( ) No
Pb & Cu Materials Survey Approved ( ) Yes (Date: _____) ( ) No
Surface Influence Determination(s) Completed ( ) Yes (Date: _____) Result: _____ ( ) No
Consent Order in Effect ( ) Yes ( ) No Effective Date of Order: _____
Other Enforcement Actions:
Source Water Assessment of all sources completed ( ) Yes ( ) No
Complaints Since Last Survey ( ) Yes ( ) No. If yes, explain:
Violations (non-bacti)/Enforcement Actions Since Last Survey ( ) Yes ( ) No. If yes, explain:

Water - _____

PART I - GENERAL INFORMATION (continued)

MONITORING HISTORY

A. SDWA Monitoring

Sample Type	Last Sample Date	Samples Collected this Survey	Violations / Deficiencies
Inorganics			
Metals			
Radiological			
VOCs			
SOCs			
Cyanide			
Nitrates			
Lead & Copper			

Bacteriological (checked over past 12 months)		
	Sampling in Accordance with BSSR	
	Notice of Excedance of PMCL [month(s)]	
	Notice of failure to Perform prescribed Monitoring (month(s))	
	Owner Issued Public Notice as Required?	

B. Other Monitoring

Raw Water Bacteriological History (checked over past 12 months)	Required? Yes / No ; If "Yes", Frequency?	
	Number of FC Positive (+) Samples	
	Number of samples with MPN > 100 organisms/100ml	

Monthly Operational Reports	All submitted for Past 12 Months	
	Appropriate operational parameter monitoring	
	All required information/analyses reported	
	C12 residual in distribution system detected 95% of the time in surface water source supplied consecutive systems	

Consumer Confidence Report Status	Was report issued to last applicable calendar year?	
	Was report information correct?	
	Was certification statement received?	

Water - _____

PART II - SYSTEM SURVEY INFORMATION (Field Notes)

A. Source(s)			C. Storage - Pneumatic			E. Storage - Atmospheric		
Sanitary Casing Seal			Protected Drain			Protected Drain		
Screened/Elbowed Casing Vent			Pressure Gauge			Screened Overflow		
12" Casing Extension			Sight Glass			Locked and Water Tight Hatch(es)		
Concrete Pad (6' Square)			Pressurizing System			Screened Vent		
Well Lot			Vacuum Relief			Sediment Observed /Floating Debris Observed		
Protected from Flood Waters			Pressure Relief			Lot Condition Adequate		
Discharge Check Valve			Exterior Condition			Water Level Indicator		
Discharge Shut-off Valve			Normal Pump Cycling			Access Ladder(s)		
Valved Blow-Off			DL&I Exp. Date (>120 gal.)			All-Weather Access		
Raw Water Sampling Tap			**D. Disinfection**			Exterior Condition –including properly modified for antennae,etc.		
Drawdown Gauge			Disinfectant (Circle One)	OCL/CL_2	OCL/CL_2	Interior Condition		
Entry Point Tap Available			Feeder Condition			Date Last Drained & Insp.		
Operable Water Meter			Spare Feeder/Repair Parts			**F. Booster Pump(s)/Stations**		
All Weather Access			Safety Features/ Precaustions adequate to protect operator and public			Adequate Protection (Housing and Flooding)		
Pitless Adapter			Room Ventilation			Proper Storage Only (non-toxic - non- explosive)		
Pump Controlled By			Contact Tank Provided			No Cross-connections		
Pumping Rate Obsv. (gpm)			Thirty minute contact time			No. Provided/Operable		
Discharge Head (psi)								
Pumping Average hrs/day			Contact tank condition			Shut-off each suction line		
B. Well House			Injection line condition			Low Pressure Cut-Off		
						Shut-off & Check Valves on each discharge Line		
Adequate Protection						Pressure Gauge on Discharge Line		
Proper Storage Only (non-toxic – non-explosive)			Solution tank condition			Compound Gauge on Suction Line		
No Cross-connections			Solution tank covered					
Lighting			Feeder Activation/Operation			Low Pressure Cut-Off Setting		
Heating			Weighing scale			Pump Controls/Auto Operable		
Electrical Wiring (safety)			Visible scale in feed equip.			Pump Controls/Manual Operable		
Floor Drain			Number full cylinders					
All-Weather Access			Booster Pump(s)			**Pump Controls**		
Wellhead Accessible			Residual test equipment			**G. Meter Vault**		
Locked			Free residual, mg/l			Drain		
Clean/Uncluttered			Field test ≈ MOR residuals			Sample Tap		
						Access (Ladder, etc.)		
						Locked Access		
						Meter Bypass		

Notes:

1. Explanations may be listed below or on an additional page(s).
2. Additional areas that should be assessed include other treatment processes/equipment not listed above, overall system operation, maintenance, and administration, training needs, previous consumer complaints.

PART II - SYSTEM SURVEY INFORMATION (CON'T)

H. General:

a. Do all chemicals used meet NSF Standard 60? ( ) Yes ( ) No
b. Do the chemical storage and handling facilities offer potential for explosions? ( ) Yes ( ) No
c. Is adequate safety equipment provided for chemical handling (i.e., rubber gloves, breathing apparatus, goggle, aprons, etc. ( ) Yes ( ) No

I. Activities or pollution sources in the immediate source water area (well lot) that represents a significant/acute health risks.

_____
_____
_____
_____

J. Source Water Assessment Update:

List land use activities of concern found but not listed in Zone 1 for the original source water assessment.

LUA TYPE	RISK	NAME OF PROPERTY OWNER	OWNER ADDRESS	LATITUDE/LONGITUDE

Deficiencies/Comments: _____
_____
_____
_____
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PART II - SYSTEM SURVEY INFORMATION (CON'T)

Deficiencies/Comments:_____

PART II - SYSTEM SURVEY INFORMATION - FLUORIDATION

Review monthly operation reports and fluoride split sample reports for the past 12 months.

Month	Number of Days Fluoride Concentration Between 0.8 and 1.0 mg/l	Split Sample Results		
		Waterworks	DCLS	Within 10% (Specific Ion Electrode) Within ± 0.2 (SPADNS)
January				
February				
March				
April				
May				
June				
July				
August				
September				
October				
November				
December				

K. Fluoride Saturator			L. Fluoride Acid		
Anti-Siphon vacuum breaker on make-up water line (upflow saturator)			**Anti-siphon protection**		
Air gap on make-up water line(downflow saturator)			**Gloves, apron, & goggles**		
Dust Mask, gloves, other safety equipment			**Chemical respirator with cartridge for Acid**		
Chemicals meets NSF standards			**Room ventilation**		
Operational water meter on make-up water line (between softener and saturator, if applicable)			**Carboy vented to outdoors**		
Water meter read and volume recorded daily			**Carboy openings sealed**		
Softener Provided			**Separate feeder/storage room**		
Upflow Saturator Pick-up Float Assembly			**Chemicals meets NSF standards**		
Frequency of softener regeneration/replacement			Feeder condition		
Hardness of make-up water (mg/l as $CaCO_3$)			Injection line condition		
Minimum of 12 inches of fluoride chemical in saturator			Weighing scale/recorder		
Metering pump and controls operating properly			Feeder activation/operation		
Back pressure sustarning valve			Back pressure sustaining valve		
Saturator Cleaning Frequency			Fluoride Ion Test Equipment		
Fluoride Ion Test Equipment			Fluoride Ion Concentration		
Fluoride Ion Concentration					

Deficiencies/Comments/FieldTestResults: _____
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Water - _____

PART II – SYSTEM SURVEY INFORMATION (Field Notes)

IRON & MANGANESE REMOVAL ($KMnO_4$ – GREENSAND FILTER)		
Cross-Connection Protection – $KMnO_4$ Mixing Tank		
Safety Eyewear and Clothing Provided		
Chemicals meet NSF Standards		
Equipment Literature Available		
Equipment Condition		
Equipment Operation Adequate		
Continuous or Batch $KMnO_4$ Addition		
Spare Metering Pump Provided		
PH Adjustment		
$KMnO_4$ Addition Follows pH Adjustment		
Supplemental Oxidants (aeration, chlorine, other)		
If Aeration, How Provided		
Is Disinfection Provided		
Suitable Sampling Taps (prior to $KMnO_4$, influent, effluent)		
Suitable $KMnO_4$ Storage (30 days minimum)		
Backwash (gravity from system/storage, pumped, other)		
No. Backwash Pumps		
Air Wash Provided		
Disposal of Backwash Waste		
Appropriate & Operable Testing Equipment		

Deficiencies/Comments/Field Test Results:

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Water - _____

PART II – SYSTEM SURVEY INFORMATION (Field Notes)

SOFTENING (CATION EXCHANGE UTILIZING NaCl)		
Treatment Purpose (softening, Fe/Mn removal, other)		
Cross-Connection Protection – Water Inlet to Brine Tank		
Chemicals meet NSF Standards		
Equipment Literature Available		
Equipment Condition		
Equipment Operation Adequate		
Bypass for Blending		
Regeneration (automatic, manual)		
Backwash (gravity from system/storage, pumped, other)		
No. Backwash Pumps		
Suitable Sampling Taps (influent, effluent, blended)		
Corrosion Problem Due to Salt Storage/Usage		
Suitable Salt Storage (30 days minimum)		
Salt Storage/Brine Tank Separated from Vulnerable Equipment		
Disposal of Brine Waste		
Appropriate & Operable Testing Equipment		

Deficiencies/Comments/Field Test Results:

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Water - _____

PART II – SYSTEM SURVEY INFORMATION (Field Notes)

DISTRIBUTION SYSTEM EVALUATION		
Pipe Material(s)		
Plans/Sketches Available With Valve Locations		
System Maintenance/Operation Adequate		
Adequate Line Sizes		
Adequate Pressure Maintained Throughout System (>20 psi during peak flow)		
How Often Is Pressure Monitoring Conducted?		
Individual Service Meters		
Provisions for Flushing (hydrants, blow-offs, etc.)		
Routine Flushing Program in Practice		
Fire Protection Provided		
How Often Are Fire Flow Tests Conducted (with fire dept.)?		
How Often Are Hydrants' Operational Status Checked?		
How Often Are Water Audits Conducted?		
Leakage rates > 30% (poses unacceptable risk of back siphonage)		
Adequate Valving to Minimize Service Interruptions		
How Often Are System Valves Exercised?		
Corrosion Control Program Practiced		
Problems/Complaints Past Year (taste & odor, pressure, Turbidity/sediment, color, service interruptions, etc.)		
Disinfection residuals meet requirements		
Are Proper Disinfection/Sampling Procedures per the AWWA Standard For Pipe Repairs Used?		
Is Redisinfection practiced? Describe below.		
Interconnected to Another System		
Records of Repairs, Flushing, Hydrant Testing ,Fire Flow Tests, Water Audits, Complaints, etc. maintained		
How often are air/vacuum valves checked for operability?		
Are air/vacuum valves protected from contamination?		

Deficiencies/Comments/Field Test Results: _____

Water - _____

PART II – SYSTEM SURVEY INFORMATION (Field Notes)

CORROSION CONTROL TREATMENT		
Type Treatment (ortho/poly/blend – phosphate, pH/alkalinity adjustment, sequestration, calcite contactor, silicate, etc.)		
Back Siphonage Protection Provided		
Safety Eyewear and Clothing Provided		
Chemical(s) Meet NSF Standards		
Equipment Literature Available		
Equipment Condition		
Equipment Operation Adequate		
Spare Feeder/Metering Pump		
Proper Mixing Downstream of Chemical Addition		
Adequate Mixing Provided for Chemical Slurries		
Separate Feeder/Storage Room Provided		
Suitable Chemical Storage (30 days minimum)		
Suitable Sampling Taps (upstream, downstream)		
Calcite Addition Based Upon (calcite contractor)		
Disposal of Backwash Waste (downflow calcite contractor)		
Appropriate & Operable Testing Equipment		

Deficiencies/Comments/Field Test Results:

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Water - _____

PART II – SYSTEM SURVEY INFORMATION (Field Notes)

SPRING / SPRING ENCLOSURE/PUMP FACILITIES		
Protected From Flooding		
Spring Overflow Screened		
Spring Lot		
All-Weather Access		
No Cross Connections		
Clean/Uncluttered		
Improper Storage of Contaminants		
Spring Enclosure Condition/Acceptable		
Spring Enclosure Protected (Lot Fenced)		
Locked		
Electrical Wiring (safety)		
Lighting		
Heating		
Entry Point Tap Available		
Raw Water Sampling Tap		
Discharge Check Valve		
Discharge Shut-Off Valve		
Valved Discharge to Waste		
Operable Water Meter		
Pumping Rate Observed (gpm)		
Pump(s) Controlled By		
Discharge Head (psi)		

Deficiencies/Comments/Field Test Results:

_____

_____

_____

_____

_____

_____

_____

_____

_____

PART II – SYSTEM SURVEY INFORMATION (Filtration)

(Other than Conventional Media Filtration – Includes Membranes, Cartridges, etc.)

Type Equipment **:** _____

No. Filtration Units: _____ Flux Rate: _____ gpm/ft^2

Design Capacity Each Unit: _____ System Design Capacity: _____

Pre-Screen Provided ( ) Yes Size: _____ Mesh Cleaning Frequency: _____ ( ) No

Pore Size Rating: Pre-filter: _____ µ Final Filter: _____ µ

Final Filter Absolute or Nominal Rated ( ) Absolute ( ) Nominal

Pre-Treatment Chemical(s) Added to Raw Water ( ) Yes ( ) No
If "Yes", Chemical(s) Added and Application Point(s): _____

ASME Rated Filter Element Housings ( ) Yes ( ) No ( ) NA

Operable Means of Insuring System Integrity ( ) Bubble Point ( ) Differential Pressure
( ) Particle Counter/Monitor ( ) Other: _____

Frequency of Integrity Verification: _____

Alarm and Automatic System Shutdown on Failed Integrity Test ( ) Yes ( ) No

Turbidity Monitoring ( ) Yes ( ) No Monitoring Point(s) ( ) Feed ( ) Product
In-Line Continuous Monitoring ( ) Yes ( ) No
Calibration Frequency: _____
Recording Capability ( ) Yes ( ) No How Many Days? _____
Alarm and System Shutdown on High Turbidity ( ) Yes ( ) No
If "Yes", Shutdown Setpoint: _____ NTU
Alarm Reported to: _____ Continuously Manned ( ) Yes ( ) No
Bypass to Waste on High Turbidity ( ) Yes ( ) No
Manual System Restart or On-site Operator-Initiated Automatic Restart ( ) Yes ( ) No

Particle Counter ( ) Yes ( ) No Monitoring Point(s) ( ) Feed ( ) Product
Particle Monitor ( ) Yes ( ) No Monitoring Point(s) ( ) Feed ( ) Product
In-Line Continuous Particle Count/Index Feed Water Monitoring ( ) Yes ( ) No
In-Line Continuous Particle Count/Index Product Water Monitoring ( ) Yes ( ) No
Recording Capability ( ) Yes ( ) No How Many Days?_____
Alarm and System Shutdown on High Count/Index ( ) Yes ( ) No
If "Yes", Shutdown Setpoint: _____
Alarm Reported to: _____ Continuously Manned ( ) Yes ( ) No
Bypass to Waste on High Particle Count/Index ( ) Yes ( ) No
Manual System Restart or On-site Operator-Initiated Automatic Restart ( ) Yes ( ) No

PART II - SYSTEM SURVEY INFORMATION (Filtration)

Alarm and System Shutdown on Contravention of Finished Water Disinfectant Residual

( ) Yes ( ) No

If "Yes", Shutdown Setpoint: . mg/l - "CT" Requirement: _____ mg-min/L
"CT" Violations Since Last Inspection: _____

Filter Appurtenances (operable and in good operating condition)

All Valves/Controls	( ) Yes ( ) No
Pressure Gauges	( ) Yes ( ) No
Filter Rate-of-Flow Indicator	( ) Yes ( ) No ( ) NA
Filter Rate-of-Flow Controls	( ) Yes ( ) No ( ) NA
Backwash Rate-of-Flow Indicator	( ) Yes ( ) No ( ) NA
Feed Pump(s)	( ) Yes ( ) No ( ) NA
Backwash Pump(s)/Controls	( ) Yes ( ) No ( ) NA
PLC/Solenoids	( ) Yes ( ) No ( ) NA
Adequate Spare Parts Inventory	( ) Yes ( ) No

Alarm and System Shutdown on High Differential Pressure ( ) Yes ( ) No ( ) NA
If "Yes", Shutdown Setpoint: _____ psi

Backwash Based Upon ( ) Pressure Differential [_____ psi differential]
( ) Turbidity [_____ NTU]
( ) Time [_____ hours]
( ) Particle Count/Index [_____] Size Range [_____μ]
( ) N/A
Backwash Duration Determined By: _____

Backwash Observed ( ) Yes ( ) No ( ) NA Comments: _____

Is Filter-to-Waste Practiced Following Backwash	( ) Yes ( ) No ( ) NA
Average Filter-to-Waste Duration: _____	minutes
Filter-to-Waste at Design Filtration Rate	( ) Yes ( ) No ( ) NA
Turbidity Monitored During Filter-to-Waste	( ) Yes ( ) No ( ) NA
Particle Count/Index Monitored During Filter-to-Waste	( ) Yes ( ) No ( ) NA

PART II - SYSTEM SURVEY INFORMATION (Filtration)

Hours Plant is Operated per day: _____

Is Staffing in Accordance with the Waterworks Regulations ( ) Yes ( ) No

Operational / Performance Data at Time of Inspection:

Test Run	Raw Water	Finished Water
Turbidity		
Flow Rate		
Particle Count/Index		
Chlorine Residual (Free)		

For Membrane Systems, Transmembrane Pressure Noted ( ) Yes ( ) No ( ) NA
If "Yes", Note Unit No. and Pressure: _____

General Performance ( ) Satisfactory ( ) Unsatisfactory ( ) Needs Attention

Maintenance Contract for Filtration System in Place ( ) Yes ( ) No
If "Yes", By: _____ Last Service Date: _____

Physical Condition ( ) Satisfactory ( ) Unsatisfactory ( ) Needs Attention

Normal Filter Element(s)/Module(s) Replacement Frequency: _____
Date Element(s)/Module(s) Last Replaced: _____

Chemical Cleaning of Element(s) or Module(s) Practiced ( ) Yes ( ) No ( ) NA
If “Yes”, Frequency: _____ Chemical(s) Used: _____

Chemical(s) Meet NSF Standard 60 ( ) Yes ( ) No

Residuals Disposal: _____

Residuals Treatment ( ) Yes ( ) No ( ) NA
If “Yes”, Describe: _____

Waste Recycle Practiced ( ) Yes ( ) No ( ) NA
If “Yes”, Describe: _____

Deficiencies/Comments: _____
_____
_____
_____
_____
_____
_____

PART II – SYSTEM SURVEY INFORMATION (Filtration)
(Other than Conventional Media Filtration – Includes Membranes, Cartridges, etc.)

Membrane Filters

1. No. of Membrane Units Provided: _____ No. In Operation: _____
   Manufacturer _____

2. Mode of Operation: ( ) Parallel ( ) Series

3. Transmembrane pressure: Unit # ___ ___ psi Unit # _____ Unit # _____
   Unit Shutdown Set Point: _____ psi for _____ seconds

4. No. of Particle Counters Provided: ____ (1/Unit) No. In Operation: _____
   Unit # _____ Particle Count (2 – 10 micron range): _____ particles/80 mls
   Unit # _____ Particle Count (2 – 10 micron range): _____ particles/80 mls
   Unit # _____ Particle Count (2 – 10 micron range): _____ particles/80 mls
   Plant Shutdown Set Point: _____ particles/ml - _____

5. No. of Effluent Turbidimeters: _____ (1/unit) No. In Operation: _____
   Filtrate Turbidity: _____ ntu
   Plant Shutdown Set Point: _____ ntu

6. Membrane Integrity Testing – Air Pressure Hold Test
   Frequency: _____
   Integrity test pressure set point: _____ psi
   Plant Shutdown Set Point: _____ psi drop over _____
   Other: (described) _____

7. Membrane Flushing (Backwashing) – At plant Startup and as programmed
   Program Frequency: ___ Every ____ minutes or Transmembrane Pressure: ___ psi

8. Process Wastewater Holding Tank Satisfactory: ( )Yes ( ) No ( ) N/A
   Process Wastewater Tank Drain Flap Gate Operational: ( ) Yes ( ) No ( ) N/A

9. Air Supply System ( ) N/A
   No. of Air Compressors Provided: _____ No. in Operation: _____
   Air Regulating Valves Operational: ( ) Yes ( ) No
   Required Minimum Air Pressure Setting: ____ psi Plant Shutdown Setting: ____ psi
   Pressures meeting required minimums: ( ) Yes ( ) No
   Manual Air Gauges Operable: ( ) Yes ( ) No
   Compressor condensation drain lines open and screened: ( ) Yes ( ) No
   Auto Plant Shutdown for low air pressure operable: ( ) Yes ( ) No

PART II – SYSTEM SURVEY INFORMATION (Filtration)
(Other than Conventional Media Filtration – Includes Membranes, Cartridges, etc.)
Page Two

10. Clean In Place (CIP) System

Frequency: _____ Last Performed: _____

Clean In Place Tank Heater Operable:	( ) Yes	( ) No
Clean In Place Tank Satisfactory:	( ) Yes	( ) No
Chemical Feed Pumps Provided:	( ) Yes	( ) No
Cleaning Products:	( ) Yes	( ) No
Satisfactory:	( ) Yes	( ) No
CIP Manual Control Valves Operable:	( ) Yes	( ) No
Recirculation Pump Operable:	( ) Yes	( ) No
Spare recirculation pump available:	( ) Yes	( ) No
PH Meter Operable:	( ) Yes	( ) No

11. Overall appearance/performance: ( ) Satisfactory ( ) Unsatisfactory

PART II - SYSTEM SURVEY INFORMATION (REVERSE OSMOSIS)

REVERSE OSMOSIS: {name here}	Satisfactory? Yes	No	Comments
Treatment purpose			(Microbial, Fluoride removal, Desalination, other)
Number & configuration			(Pre-filters, RO units)
Equipment condition			
Equipment operation			(Actual Feed Rate = gpm; Recovery = %; Design Feedrate = gpm; Recovery = %)
O&M manual available			
Bypass for blending			(Treated = % *or* gpm; Bypassed = % *or* gpm)
Flowmeters			Location Reading Condition
•			
•			
•			
Pressure gauges			Location Reading Condition
•			
•			
•			
Test equipment			(Equipment; Availability; Condition)
Performance Monitoring			Parameter Frequency Value
Element replacement			(Schedule or condition; Date last replaced)
Chemical Pretreatment			Refer to table below
Chemicals meet NSF 60			
Concentrate Disposal			(Location, Condition)
Field test results - Applied water - Recovered water - Blended water			Temp pH Na F Other

Pretreatment Chemical	Function	Conc.	Feedrate	Storage Location/Quantity	Remarks
	Acid for pH adjustment				
	Antiscalant				
	Sequestration of Fe & Mn				

VIRGINIA DEPARTMENT OF HEALTH
DIVISION OF DRINKING WATER
GROUNDWATER SYSTEM SANITARY SURVEY REPORT

To: _____
_____
_____

SUBJECT: _____
Water - _____
PWSID No. _____

Survey Date: _____ Survey Type: Routine Complaint Special:

Present at Survey: _____

Follow-up Survey Scheduled For: _____

Future Sampling Requirements:

Next Sample Date	Inorganics	Metals	Radiological	VOCs	SOCs	Nitrates	Lead/Copper

SAMPLE TAP LOCATIONS		
Source Name	Raw Water Tap Number and Location	Entry Point Number and Location

As a result of the sanitary survey noted above, the Department offers the following comments. Should you have questions, desire to discuss our findings, or desire a copy of the field evaluation notes, please contact us at ( ) - .

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Survey by: _____

cc: _____
_____
_____ Health Department
VDH - Division of Drinking Water

VIRGINIA DEPARTMENT OF HEALTH
DIVISION OF DRINKING WATER
GROUNDWATER SYSTEM SANITARY SURVEY REPORT

Water - _____

Comments (cont.):

APPENDIX B

COMMONWEALTH OF VIRGINIA
DIVISION OF DRINKING WATER
FIELD OFFICE - DISTRICT

WATERWORKS EVALUATION

SURFACE SOURCE
(Less Than 10,000)

* *(Waterworks Name)* *

PWSID Number _____

conducted ___(date)_____

VDH VIRGINIA DEPARTMENT OF HEALTH
Protecting You and Your Environment

TO:_____ PWSID_____

_____

_____ Subject:_____

Water - _____

WATERWORKS SANITARY SURVEY REPORT(≤10,000)

GENERAL

1. Facility name:_____

2. Facility owned by: _____

3. Address: _____

_____

Contact Person:_____ Title:_____

Telephone: ( )_____

4. Survey by: _____ Time spent on-site:_____

Survey type: _____ Routine _____ Complaint _____ Special

Waterworks type: ____ Community ____ NTNC _____ Transient NC

5. Date of survey: _____ Date memo written: _____

6. Date of last survey: _____/_____/_____

7. Date To D.E._____ Reviewed by: _____Date: _____
Date To D.F.D_____Reviewed by:_____ Date: _____

8. Present at survey: _____

9. Operation Permit No. _____ Effective date: _____

10. Permitted capacity: _____

Operating with in permitted capacity? ( ) Yes ( ) No

Special conditions or restrictions to Operation Permit or Variances or Exemptions issued? ( ) Yes ( ) No
If yes, explain:_____

11. Number of connections: _____ Population served:_____

12. Date of description sheet: _____/_____/_____ Up to date? Yes ( ) No ( )

Inventory/SDWIS records up to date? Yes ( ) No ( )
If either is no, discuss:_____

SUMMARY

Problems Identified at last survey:	Corrected?
1.	Yes
2.	No *
3.	No *

Comments/Recommendations/Necessary Actions:

1. Those items listed above and marked with an asterisk still need to be addressed.

2.

3.

Attachments:
- ☐ Part A
- ☐ Part B
- ☐ Part C

pc/att:
_____ Parts ( ) A ( ) B ( ) C
_____ Parts ( ) A ( ) B ( ) C
_____ Parts ( ) A ( ) B ( ) C
_____ Parts ( ) A ( ) B ( ) C for Dental Health

pc: _____Health Department
VDH - Division of Drinking Water
_____
_____

PART A

A. WATER QUALITY COMPLIANCE MONITORING

Sample Type	Last Sample Date	Next Sample Due Date	Problems or Violations	Samples Collected *
Inorganic				
NO_2/NO_3				
Metals				
Radiological				
VOCs				
SOCs				
Cyanide				
TTHMs				
HAA				
Unregulated Inorganics				
Unregulated Organics				
Lead/Copper				

* Sample Collected Type: 1- compliance 2 - complaint 3 - special investigation

1. Does waterworks use certified laboratories? ( ) Yes ( ) No
   If No, discuss:_____

2. Bacteriological sample siting report approved? ( ) Yes ( ) No If yes, date approved***:*** ____

3. Samples collected in accordance with report? ( ) Yes ( ) No

4. Bacteriological samples required per month: _____

5. Notices of bacteriological monitoring noncompliance since last inspection: ( ) Yes ( ) No
   (If yes, discuss below)

6. Notices of bacteriological quality noncompliance since last inspection: ( ) Yes ( ) No
   (If yes, discuss below)

7. Fluoride split samples up to date? Yes ( ) No ( ) N/A ( )

Comments/Discussion: _____
_____

8. WQP monitoring required? Yes ( ) No ( )
If yes is monitoring satisfactory? Yes ( ) No ( )

9. Disinfection residuals entering the distribution system meets requirements(0.2 mg/L)?
Yes ( ) No ( )

10. Disinfection profile available for review (staff must review). Yes ( ) No ( )

11. Acceptable Monthly Operation Reports Submitted? Yes ( ) No ( ) . If No , explain:

B. <u>RAPID MIX</u>

1. Number of units: _____ Number in service:_____

2. Type of mixing provided: ( ) conventional ( ) static in-line ( ) other_____

3. Operable mixer available to meet mixing requirements Yes ( ) No ( )

4. Describe operation: -variable speed control operational? Yes ( ) No ( ) NA ( )
-evidence of vortexing? Yes ( ) No ( )
-proper mixing obtained? Yes ( ) No ( )

5. Required chemicals applied at point(s) of application: Yes ( ) No ( )

Chemical Feed Documentation

Chemical Applied	Application Point	Feed Rate

6. Spare mixer provided? Yes ( ) No ( ) NA ( )

7. General performance: ( ) satisfactory ( ) needs attention

8. Physical condition: ( ) satisfactory ( ) needs attention

Comments:

C. FLOCCULATION/SLOW MIX

1. Number of basins:_____ Number in service:_____

2. Mode of operation: ( ) series ( ) parallel ( ) NA

3. All mixers operational? Yes ( ) No ( )

4. Operable mixers available to meet mixing requirements: Yes ( ) No ( )

5. Variable speed control operational? Yes ( ) No ( ) NA ( )

6. Tapered flocculation practiced? Yes ( ) No ( ) NA ( )

7. Isolation of basins possible with continued plant operation? Yes ( ) No ( ) N/A ( )

8. Are proper baffles/compartments provided? Yes ( ) No ( )
Evidence of vortexing/basin short-circuiting? Yes ( ) No ( )

9. Overall floc formation: ( ) satisfactory ( ) needs attention ( ) undetectable
Floc type/appearance: pin floc ( ) fluffy ( ) sweepfloc ( ) other ( )_____

10. Are polymers used? Yes ( ) No ( )

11. Chemical Feed Documentation

Chemical Applied	Application Point	Feed Rate

12. General performance: ( ) satisfactory ( ) needs attention

13. Physical condition: ( ) satisfactory ( ) needs attention

Comments:

D. SEDIMENTATION

1. No. of basins provided: _____ No. in operation: _____

2. Proper flow distributions between basins? Yes ( ) No ( )

3. Signs of short circuiting/overloads? Yes ( ) No ( )

4. Evidence of floc shear at stilling wall? Yes ( ) No ( ) unit effluent? Yes ( ) No ( )

5. Floc carry-over observed? Yes ( ) No ( )

6. Floc settleability: Satisfactory Yes ( ) No ( )
Needs Attention Yes ( ) No ( )

7. Sludge removal: ( ) manual ( ) mechanical

a. Frequency/criteria:_____

b. Last drained/cleaned:_____

c. Excessive sludge accumulation: Yes ( ) No ( ) If 'yes', estimate sludge blanket depth: _____

8. Chemical Feed Documentation

Chemical Applied	Application Point	Feed Rate

9. General performance: ( ) satisfactory ( ) needs attention

10. Physical condition: ( ) satisfactory ( ) needs attention

Comments:

E. FILTRATION

1. No. of filters provided: _____ No. in operation: _____

2. Filter media: sand ( ) sand/anthracite ( ) other ( )_____

date media last added or changed_____
frequency media depth checked: _____

3. Filtration rate:
Design: _____ mgd at _____ gpm/square foot
Observed: _____ mgd at _____ gpm/square foot
Exceeds permitted rate? Yes ( ) No ( )

Was filtration rate checked? Yes ( ) No ( )
Filter No._____ Rate:_____ gpm/square foot

Frequency operator checks filtration rate:_____
date last checked:_____

4. Filter appurtenances evaluation:

	OPERABLE		GOOD CONDITION		DATE LAST CALIBRATED
filter rate-of-flow controls:	Yes ( )	No ( )	Yes ( )	No ( )	_____
backwash pump(s)/controls:	Yes ( )	No ( )	Yes ( )	No ( )	_____
filter rate-of-flow indicator:	Yes ( )	No ( )	Yes ( )	No ( )	_____
all valves/controls:	Yes ( )	No ( )	Yes ( )	No ( )	_____
loss of head gauges:	Yes ( )	No ( )	Yes ( )	No ( )	_____
backwash rate-of-flow indicator:	Yes ( )	No ( )	Yes ( )	No ( )	_____

5. Filter backwash practices:

Filter backwash based on (plant established maximum values): Yes ( ) No ( )

( ) head loss [_____ feet] ( ) time [_____] ( ) turbidity [_____ NTU] ( ) particle counts_____particles/_____ml.:size range _____

Recent history for backwash (over past three months ending_____):

	Maximum	Average
filter run times:	_____ hours	_____ hours
head loss:	_____ feet	_____ feet
turbidity:	_____ NTU	_____ NTU
particle count:	_____	_____

Filter backwash observed? Yes ( ) No ( )
Satisfactory? Yes ( ) No ( ) NA ( )

Frequency operator checks backwash rate:_____
date last checked:_____

Criteria used to stop backwash:_____
typical backwash duration:_____

Frequency operator checks filter bed expansion:_____
date last checked:_____

6. Does plant practice filter-to-waste after backwash?: ( ) Yes ( ) No ( ) NA

criteria established for filter-to-waste: duration
_____
_____
average filter-to-waste time:_____
is turbidity monitored during filter to waste procedure? ( ) Yes ( ) No
are particles counted/monitored during procedure? ( ) Yes ( ) No

is filter to waste at design filtration rate? ( ) Yes ( ) No

7. Is filter backwashed after any/all shutdowns? ( ) Yes ( ) No
if no, does operator start filter with filter-to-waste after filter has been idle, before delivering flows to system? ( ) Yes ( ) No

8. Surface wash provided: ( ) Yes ( ) No Operable? ( )Yes ( ) No
backflow preventer provided? ( ) Yes ( ) No ( ) NA

9. Air wash provided: ( ) Yes ( ) No Operable? ( )Yes ( ) No

10. General performance: ( ) satisfactory ( ) needs attention

11. Physical condition: ( ) satisfactory ( ) needs attention

12. Chemical Feed Documentation

Chemical Applied	Application Point	Feed Rate

Comments:

F. FINISHED WATER FACILITIES

1. Clear well

access protected from contamination ( ) Yes ( ) No
overflow protected from contamination ( ) Yes ( ) No
adequate drain ( ) Yes ( ) No
screened vent(s) ( ) Yes ( ) No
watertight roof/cover ( ) Yes ( ) No
hatch(s) secure ( ) Yes ( ) No
viewing port with light ( ) Yes ( ) No
sediment present ( ) Yes ( ) No
last cleaned: _____

Physical condition: ( ) satisfactory ( ) needs attention

2. Finished water pumps: ( ) NA

number of pumps provided: _____
number of pumps operable: _____
number of pumps in use: _____
pressure gauges provided/operable ( ) Yes ( ) No
flow meter operable ( ) Yes ( ) No
pumping rate: _____ gpm/mgd

Physical condition: ( ) satisfactory ( ) needs attention

3. Is clearwell water level monitored/controlled? ( ) Yes ( ) No ( ) NA

4. Are level sensors operable? ( ) Yes ( ) No ( ) NA

5. Chemical Feed Documentation

Chemical Applied	Application Point	Feed Rate

6. Approved backflow device to isolate process water at treatment plant from distribution system?
( ) Yes ( ) No

Comments:

G. WASTE HANDLING

1. Backwash, filter-to-waste, and/or settling basin wastewaters discharged to:
( ) lagoons
( ) holding tank/sand beds
( ) other_____

2. Ultimate discharge of waste flows:_____

3. Provisions for waste recycle to head of plant? ( ) Yes ( ) No
Is waste recycle practiced? ( ) Yes ( ) No
Is recycle stream monitored? ( ) Yes ( ) No If Yes, what is monitored?_____

Is approved treatment provided for recycle flows? ( ) Yes ( ) No
VDH approval date: _____
If yes, describe.

Are floor drains in chemical storage and feed areas separated from process waste flow streams?
( ) Yes ( ) No

Comments:

H. CHEMICAL FEED FACILITIES

1. The following chemicals are fed at this facility:

( ) alum	( ) pre-soda ash	( ) pre-chlorine	( ) ammonia
( ) ferric salt	( ) post-soda ash	( ) post-chlorine	( ) chlorine dioxide
( ) ferrous salt	( ) carbon	( ) $KMnO_4$	( ) filter aid
( ) pre-lime	( ) fluoride _____		
( ) post-lime	( ) corrosion inhibitor _____		
( ) other(s) _____			

Chemicals certified to meet NSF Standard 60? Yes ( ) No ( )

2. All feeders in good condition? Yes ( ) No ( )

3. Adequate ventilation provided? Yes ( ) No ( )

4. Spare feeders provided where needed? Yes ( ) No ( )

5. Adequate backflow prevention on solution water? Yes ( ) No ( )

anti-siphon devices on feed lines? Yes ( ) No ( )

6. Feeders calibrated on a regular basis? Yes ( ) No ( )

frequency operators calibrate feeders: _____
date last calibrated: _____

frequency operators check calibrations: _____
date last checked: _____

Adequate Chemical Storage area provided
(space, spill prevention)? Yes ( ) No ( )

7. Chlorination/chlorine feed appurtenances:

adequate ventilation	Yes( ) No( )
cylinders chained	Yes( ) No( ) NA( )
panic hardware	Yes( ) No( ) NA( )
cylinder repair kit	Yes( ) No( ) NA( )
chlorine scales operable	Yes( ) No( ) NA( )
automatic change-over provided/operable	Yes( ) No( ) NA( )
vent properly installed/screened	Yes( ) No( ) NA( )
leak detection (type:_____)	Yes( ) No( )
outside entrance/exit	Yes( ) No( )
room gas-tight, floor drains sealed	Yes( ) No( )

8. Fluoridation/fluoride feed appurtenances:

scales provided and in good operating condition	Yes ( ) No ( ) NA ( )
water meter/fluoride feed pacer/other control system provided, in good operating condition	Yes ( ) No ( ) NA ( )
anti-siphon protection on all feed lines	Yes ( ) No ( ) NA ( )
fluoride chemical storage satisfactory	Yes ( ) No ( ) NA ( )
water softener provided and in good operating condition	Yes ( ) No ( ) NA ( )
softener effluent hardness maintained <75 mg/l	Yes ( ) No ( ) NA ( )

9. Is corrosion control practiced at this facility: Yes ( ) No ( )
   if yes, indicate method(s):
   ( ) pH/alkalinity adjustment
   ( ) corrosion inhibitor
   ( ) other_____

10. Physical condition of chemical feed facilities: ( ) satisfactory ( ) needs attention

11. Adequate safety equipment provided for chemical handling (i.e., rubber gloves, breathing apparatus, goggles, aprons, etc.)? Yes ( ) No ( )

12. Do any of the chemical storage or handling facilities offer potential for explosions? Yes ( ) No ( )

13. Other safety problems for the operators or public noted? Yes ( ) No ( ) Describe _____

Comments:

I. OPERATIONAL/PERFORMANCE DATA

1. At time of survey

Test run	RAW Frequency/ Results	APPLIED Frequency/ Results	FINISHED Frequency/ Results
Turbidity			
pH			
Hardness			
Alkalinity			
Temperature			
Free Cl_2			
Fluoride			
Iron			
Manganese			
Other			

Note: * = performance of this test was observed.

Plant flow at time of inspection:
Raw water _____
Finished water _____

2. Chemical Dosages:

primary coag.	_____ @ ____	mg/l
pre-pH/alk	_____ @ ____	mg/l
post-pH/alk	_____ @ ____	mg/l
pre-chlorine	_____	lb/day or mg/l
post-chlorine	_____	lb/day or mg/l
others	_____ @ ____	mg/l
	_____ @ ____	mg/l
	_____ @ ____	mg/l

3. Range of turbidity values for individual filter effluents:
_____ NTU to _____ NTU

Comments:

J. LABORATORY/STAFF MONITORING PROCEDURES

1. Following equipment provided and in good condition?

turbidimeter	Yes ( ) No ( )	
pH meter	Yes ( ) No ( )	
jar test machine	Yes ( ) No ( )	
Zeta meter	Yes ( ) No ( )	NA ( )
pilot filters	Yes ( ) No ( )	NA ( )
streaming current monitor	Yes ( ) No ( )	NA ( )
particle counter/monitor	Yes ( ) No ( )	NA ( )

If yes, locations monitored _____

2. Are adequate equipment and reagents available to run

necessary operational tests?	Yes ( ) No ( )	
are reagents dated?	Yes ( ) No ( )	
reagents out of date?	Yes ( ) No ( )	
are test procedures appropriate?	Yes ( ) No ( )	
are desk-top units calibrated at appropriate intervals?	Yes ( ) No ( )	

3. Fluoride test utilized: _____

equipment in good condition?	Yes ( ) No ( )	NA ( )
standards up-to-date?	Yes ( ) No ( )	NA ( )

4. Is continuous pH monitoring equipment provided and in good condition? Yes ( ) No ( ) NA ( )
do continuous monitor readings correspond to desk-top readings? Yes ( ) No ( ) N/A ( )
Frequency of continuous monitoring unit calibration: _____

5. Does plant have laboratory capability for:

algae counts and identification?	Yes ( ) No ( )
threshold odor determinations?	Yes ( ) No ( )
iron and manganese analyses?	Yes ( ) No ( )

6. Adequate backflow prevention devices at sinks, etc. Yes ( ) No ( )

7. Is a daily log/data sheet maintained?	Yes ( ) No ( )
Were these daily log/data sheets reviewed?	Yes ( ) No ( )
Are the daily log/data sheets adequate?	Yes ( ) No ( )
Is the frequency of operational data collection adequate?	Yes ( ) No ( )
Are there any obvious problems noted from the log entries?	Yes ( ) No ( )
Are changes in operating conditions noted?	Yes ( ) No ( )

K. OPERATING STAFF

1. Water treatment plant classification: I ( ) II ( ) III ( ) IV ( )

2. Operator in responsible charge (OIRC): _____
License number: _____ Class: _____

3. Is OIRC ( ) on staff ( ) on contract ( ) other _____

4. List Name, Class and License Numbers of other operating staff (shift supervisors, etc.):

5. How are plant operating decisions made and communicated?_____
_____
_____

6. Hours plant is operated per day: _____

Hours per day OIRC is present: _____

7. Are there criteria and procedures established for plant shut down in case of unit process failure or upset or in event of significant overall quality degradation? ( ) Yes ( ) No

Comments:

L. OPERATIONAL STAFF MONITORING PROCEDURES

1. Is a daily log/data sheet maintained? ( ) Yes ( ) No
   Were these daily log/data sheets reviewed? ( ) Yes ( ) No
   Are the daily log/data sheets adequate? ( ) Yes ( ) No
   Is the frequency of operational data collection adequate? ( ) Yes ( ) No
   Are there any obvious problems noted from the log entries? ( ) Yes ( ) No

2. How is the coagulation process controlled?
   ( ) Pilot Filter ( ) Jar Tests
   ( ) Zeta Meter ( ) Streaming Current Monitor
   Were coagulation control procedures observed/discussed? ( ) Yes ( ) No
   Were the procedures adequate? ( ) Yes ( ) No

3. Turbidity Monitoring:
   A. What is the frequency of the representative (combined) filter effluent turbidity monitoring?
   ( ) _____ times per shift ( ) continuous

   Is this frequency adequate (at least every 4 hours)? ( ) Yes ( ) No

   Are continuous turbidity monitoring units provided and in good condition? ( ) Yes ( ) No

   B. Does each filter effluent have an individual continuous turbidity monitor? ( ) Yes ( ) No

   Does the filter effluent turbidity monitoring system have alarm set points? ( ) Yes ( ) No ( ) N/A
   Alarm set point(s):_____Alarm type:audio,visual,other:_____

   Is data recorded at least every 15 minutes? ( ) Yes ( ) No

   C. Desk-top turbidimeter manufacturer:_____ model no._____

   date last calibrated: _____
   calibration date posted: ( ) Yes ( ) No
   date bulb last changed: _____
   spare bulb on hand: ( ) Yes ( ) No
   condition of cuvettes: _____
   primary standard used: ( ) Amco AEPA-1 ( ) Formazin ( )Stablcal
   expiration date of primary standard: _____
   secondary standard used: _____
   expiration date of secondary standard: _____
   date secondary last compared to primary: _____
   turbidity-free water available: ( ) Yes ( ) No
   do continuous monitor readings correspond to desk-top unit readings? ( ) Yes ( ) No ( ) NA

4. Method of chlorine residual compliance monitoring: _____

Continuous residual monitor operational? ( ) Yes ( ) No
Has operable alarm? ( )Yes ( ) No

if system serves less than 3300, frequency of residual monitoring: _____

free chlorine residual measured and reported? ( ) Yes ( ) No

5. Chlorine residual necessary to meet CT requirements:

_____mg/l free chlorine as measured at _____

Is staff aware of the required minimum residual? ( ) Yes ( ) No

Is this concentration being continuously met? ( ) Yes ( ) No

if "No", is staff checking other parameters (pH, temperatures, clearwell levels, etc.) and taking appropriate steps to ensure that CT requirements are being met on a continuous basis? ( ) Yes ( ) No

6. Overall appearance of laboratory: ( ) satisfactory ( ) needs attention

Comments:

PART B

A. RAW WATER INTAKE/SOURCE EVALUATION

Source Name: _____

1. Intake located on: ( ) stream ( ) reservoir

2. Observed (visible) water quality:

   ( ) clear ( ) turbid
   ( ) colored _____ ( ) other _____

3. Activities or pollution sources in the immediate source water area (under waterworks control) that represent significant/acute health risk: ( ) Yes ( ) No
   Describe**:** _____

4. Has there been a contamination event since last evaluation (date of evaluation ___)? ( ) Yes ( ) No

   If "Yes", discuss: _____
   _____

5. Reservoir level/stream flow: ( ) normal ( ) high ( ) low

6. For in-stream intake:

   check dam provided: ( ) Yes ( ) No
   condition of check dam: _____
   stream flow rate monitoring provided: ( ) Yes ( ) No

7. Condition of intake structure:_____

   screen provided: ( ) manual ( ) mechanical ( ) none
   condition of screen: ( ) satisfactory ( ) needs attention
   method of cleaning screen: _____
   if mechanical, is it operable/used: _____
   number of intake levels provided: _____ depths:_____
   drawoff depth/level being used: _____
   access provided to intake structure: _____

8. Raw water pumps

number provided:_____ number operable:_____
number in use: _____ pumping rate:_____

Present water demand exceeds pumping rate? ( ) Yes ( ) No

pump station subject to flooding: ( ) Yes ( ) No
protected against trespassing/vandalism: ( ) Yes ( ) No
access road to pump station maintained ? ( ) Yes ( ) No
when were pumps/valves last maintained/checked:_____

9. Treatment provided at intake (describe): _____
_____

10. Physical condition of intake: ( ) satisfactory ( ) needs attention

Intake components restrict ability of the waterworks to meet present demand? ( ) Yes ( ) No

11. Present water demand exceeds source yield? ( ) Yes ( ) No

Comments:

B. DISTRIBUTION SYSTEM EVALUATION

1. Distribution System Survey

a. Map of distribution system available ( ) Yes ( ) No
frequency of map updates: _____

b. Materials used:
( ) ductile iron ( ) cast iron
( ) asbestos cement ( ) galvanized
( ) PVC ( ) other plastic _____
( ) other(s)_____

c. Valve guide available ( ) Yes ( ) No

2. Piping System Maintenance

a. Water audit conducted ( ) Yes ( ) No
accountability determined? ( ) Yes ( ) No
if yes, _____% accountability
systematic leak detection program ( ) Yes ( ) No
systematic leak repair program ( ) Yes ( ) No
meter repair program ( ) Yes ( ) No
records maintained ( ) Yes ( ) No

b. Distribution system routinely flushed ( ) Yes ( ) No
frequency: _____
records maintained ( ) Yes ( ) No

c. Fire hydrants
operational status checked ( ) Yes ( ) No
by whom: _____
frequency:_____
records maintained ( ) Yes ( ) No
flow tested ( ) Yes ( ) No
flow coded ( ) Yes ( ) No

d. Valve exercise program
valves checked for operability ( ) Yes ( ) No
frequency:_____
records maintained ( ) Yes ( ) No

e. Corrosion control program
piping conditions examined ( ) Yes ( ) No
water stability determined ( ) Yes ( ) No
method:_____ frequency:_____
other corrosivity/corrosion control tests performed
method:_____ frequency:_____

f. Air/vacuum valves
checked for operability ( ) Yes ( ) No
frequency: _____
protected from contamination ( ) Yes ( ) No

3. Distribution system problems

a. problems/complaints logged by owner in past year ( ) Yes ( ) No
( ) taste & odor
( ) discolored water/sediment in water
( ) pressure problems (<20 psi at peak flow)
( ) service interruptions
( ) other _____

b. records kept for three years ( ) Yes ( ) No

c. leakage rates > 30% (poses unacceptable risk of back siphonage) ( ) Yes ( ) No

discuss problem(s), resolution:

4. Water quality and compliance monitoring

a. Pb/Cu monitoring materials survey approved/date _____ ( ) Yes ( ) No
Samples collected in accordance with approved plan ( ) Yes ( ) No

b. Chlorine residual analyses
( ) free ( ) total
method:_____
number of locations:_____
frequency of monitoring:_____
minimum residual measured:_____

c. Heterotrophic Plate Counts ( ) Yes ( ) No
number of locations:_____
frequency of monitoring:_____
maximum count:_____

d. Total Trihalomethanes ( ) Yes ( ) No
number sample sites:_____
sample locations representative of:
maximum residence time (25%) ( ) Yes ( ) No
normal population spread ( ) Yes ( ) No
and system residence time

e. Turbidity analyses ( ) Yes ( ) No
locations representative ( ) Yes ( ) No

f. Records management for above monitoring

records maintained for 3 years	( ) Yes ( ) No
sampling locations marked on map	( ) Yes ( ) No

5. Is rechlorination practiced? ( ) Yes ( ) No

Type of equipment _____

adequate ventilation	Yes( ) No( )
cylinders chained	Yes( ) No( ) NA( )
panic hardware	Yes( ) No( ) NA( )
cylinder repair kit	Yes( ) No( ) NA( )
chlorine scales operable	Yes( ) No( ) NA( )
automatic change-over provided/operable	Yes( ) No( ) NA( )
vent properly installed/screened	Yes( ) No( ) NA( )
leak detection (type:_____)	Yes( ) No( )
outside entrance/exit	Yes( ) No( )
room gas-tight, floor drains sealed	Yes( ) No( )

Comments:

C. CROSS CONNECTION CONTROL PROGRAM

1. Does utility/plant have an approved Cross-Connection Control Program? ( ) Yes ( ) No
   date of approval:_____
   person in responsible charge:_____

2. Periodic inspections/surveys made in accordance with the approved program? ( ) Yes ( ) No

3. Backflow prevention devices tested in accordance with the approved program? ( ) Yes ( ) No

4. All booster/jockey/fire pumps in system equipped with low pressure cut-off switches on suction lines? ( ) Yes ( ) No
   are the cut-off switches tested? ( ) Yes ( ) No

5. Are inspection/test records maintained? ( ) Yes ( ) No
   location:_____
   records maintained for 10 years? ( ) Yes ( ) No
   were records reviewed? ( ) Yes ( ) No
   are records satisfactory? ( ) Yes ( ) No

Comments:

D. Distribution Storage **PWSID _____**

STORAGE TANK NAME				
A. WATER QUALITY PROTECTION				
1. Structure Watertight				
2. Vent Shielded and Screened				
3. Drain Satisfactory				
4. Tank Overflow				
a. Screened				
b. Surface Air Gap Provided				
c. Splashpad/Erosion				
5. Access:				
a. Roof Hatch Watertight				
b. Sidewall Access Watertight				
c. Accesses Locked/Bolted				
6. Other Tank Openings				
a. Curbed and Sleeved				
b. Covered				
7. Maintenance/Repair Date				
8. Last Date of Professional Tank Survey(recommend~5yr)				
9. Tank(s) Appears Structurally Sound?				
(Discuss in "Comments" below)				
10. Properly modified for Antennae?				
B. WATER QUALITY MAINTENANCE				
1. Sample Tap Available				
2. Frequency Samples Collected				
3. Floating Debris Observed				
4. Good Turnover Potential				
5. Flushed/Cleaned Date				
A. OPERATION				
1. Tank Level Controls Operable				
a. Automatic				
b. Manual				
2. Tank Level Recorded				
3. Automatic Recorder Operable				
B. CORROSION CONTROL				
1. Routine Interior Inspections Scheduled				
2. Interior Corrosion Visible				
3. Exterior Corrision Visible				
4. Cathodic Protection Operable				
C. SAFETY				
1. Interior/Exterior Ladder Condition				
2. Interior/Exterior Ladder Guard				
3. Adequate Railing Available				
4. Safety Belt Available				
D. LOT				
1. Upkeep				
2. Access Road Maintained				
3. Surface Water Diverted				
4. Fence Condition Good				
5. Access Locked				

Y=YES; N=NO; N/A=NOT APPLICABLE; N/1=NOT INSPECTED; NON=NONE; OK-ACCEPTABLE

COMMENTS: _____
_____

E. Distribution Pump Station **PWSID _____**

PUMP STATION NAME				
A. PUMP STATION LOT				
1. Upkeep Adequate				
2. Surface Water Diverted Away				
3. Access Road Maintained				
B. PUMP STATION BUILDING				
1. Light Operable				
2. Ventilation Operable				
3. Heating Operable				
4. Pump Gland Piped to Drain				
5. Concrete Floor				
6. Screened Floor Drain				
7. Locked				
8. Deterioration &/or Damage Evident				
9. Storage of toxic chemicals				
C. PUMP STATION OPERATIONS				
1. No. of Pumps				
2. All Operable				
3. Pump Controls:				
a. Automatic				
b. Manual				
4. Pump Alternation:				
a. Automatic				
b. Manual				
5. Flow Meter Operable				
6. Low Pressure Cut-off				
7. Alarm Operable				
8. Compound Gauges Operable				
9. Cross Connections are present				
D. PUMP MAINTENANCE				
1. Pump Service Schedule				
2. Pump Service Recorded				
3. Discharge Gate Valve				
4. Suction Gate Valve				
5. Check Valve				
E. HYDROPNEUMATIC TANKS				
1. Pressure Gauge				
2. Pressurizing System				
3. Pressure Operating Range				
4. Sight Gauge				
5. Drain				
6. Pressure Relief Valve				
7. Vacuum Relief Valve				
8. Exterior Condition				
9. Dept.of Labor & Industry Date(>120 gal)				
10. Normal Pump Cycling				

Y=YES; N=NO; N/A=NOT APPLICABLE; N/I=NOT INSPECTED; NON=NONE; OK=ACCEPTABLE
Items repaired/replaced since last inspection: _____
_____
Comments: _____

SUPPLEMENTAL AND USEFUL WORKSHEETS

(the use of these worksheets is optional)
(attach these to report if used during survey)

1. Jar Test Results

2. Filter Drop Test Results

3. Other pages as developed and appropriate

Jar Test Results

Plant: _____

Date: _____

Performed By: _____

Raw Water Characteristics:

pH _____
Temperature _____ ^{0}F
Turbidity _____ NTU (Turb.)
Alkalinity _____ (mg/L as $CaCO_3$) (Alk.)
Total Hardness _____ (mg/L as $CaCO_3$) (TH)

Jar No.	Coag. Dose (mg/L)	Alk. Adj. (mg/L)	Floc Forming	Floc Settling Charac.	Settled pH	Settled Alk.	Settled TH	Settled Turb.
1								
2								
3								
4								
5								
6								

Coagulant Used: _____ Alkalinity Adjustment: _____

_____ RPM for _____ minutes; _____ RPM for _____ minutes; _____ RPM for _____ minutes

Settling Time: _____ minutes

Filter Drop Test Results

Plant: _____

Date: _____

Inspected By: _____

No. of Filters: _____

Filter Box Area: _____

Gullet Area: _____

Effective Filter Surface Area: _____

Volume Filtered: _____

Filter No.	Time For 6" Drop	Calc. Filter Rate	Indicated Filter Rate	Head Loss Indicated	Head Loss Measured

PART C

A. **SYSTEM MANAGEMENT AND ADMINISTRATION**

1. Is the system's management familiar with the system's facilities and their needs? ( ) Yes ( ) No

2. Do managers have clear lines of communication established with plant and system operational staff? ( ) Yes ( ) No

3. Are operational policies clearly set forth and communicated/made available to operating staff? ( ) Yes ( ) No

4. Has an Operations & Maintenance Manual been prepared for the plant and system? ( ) Yes ( ) No

   is the manual kept up-to-date? ( ) Yes ( ) No

5. Does good communications flow exist between the Operator In Responsible Charge and other operating staff (particularly shift supervisors)? ( ) Yes ( ) No

6. Are shift supervisors held responsible for all decisions made while on duty? ( ) Yes ( ) No

7. Do Operator in Responsible Charge and shift supervisors have 24-hour access to management staff capable of authorizing emergency expenditures? ( ) Yes ( ) No

8. Has an emergency operations plan been established? ( ) Yes ( ) No
   has the plan been tested? ( ) Yes ( ) No
   is the plant equipped with an emergency power generator capable of powering plant at average flow? ( ) Yes ( ) No
   other provisions for continuous operability ( ) Yes ( ) No

9. Are procedures established to notify customers of health advisories, water conservation restrictions, or other emergencies? ( ) Yes ( ) No

10. Does current staffing meet regulatory requirements (for both numbers and classes)? ( ) Yes ( ) No
    Are sufficient staff (plant, system, and laboratory) provided? ( )Yes ( ) No
    Will system be adequately staffed in case of illness or vacation? ( ) Yes ( ) No

11. Are personnel adequately trained? ( ) Yes ( ) No

12. Is there an active, on-going staff training program, either in-house or outside? ( ) Yes ( ) No

13. Are there problems with personnel turnover? ( ) Yes ( ) No

14. Does management have plans for addressing system growth or regulatory requirements for improvements? ( ) Yes ( ) No

15. Are sufficient funds allocated for system maintenance and upkeep? ( ) Yes ( ) No

Is a sinking fund established to cover necessary replacements (or system expansion/improvement)? ( ) Yes ( ) No

16. Is there an established safety program? ( ) Yes ( ) No

17. Are preventative maintenance tasks scheduled and performed? ( ) Yes ( ) No

18. Has the system completed the public notification required by the Lead Contamination Control Act? ( ) Yes ( ) No

delivered how:_____ when:_____
documentation given to DDW: ( ) Yes/when_____ ( ) No

are new connections to the system notified? ( ) Yes ( ) No

19. If Notices of Violation for monitoring, Maximum Contaminant Level exceedance, or other problems have been issued to the waterworks, has public notification been accomplished properly and promptly? ( ) Yes ( ) No

Are new connections to the system notified of current or unresolved problems? ( ) Yes ( ) No

20. Consumer Confidence Report: Was report issued for last applicable calendar year? ( ) Yes ( ) No
Was report information correct? ( ) Yes ( ) No
Was certification statement received? ( ) Yes ( ) No

Comments:

B. SOURCE WATER ASSESSMENT/ PROTECTION

1. Source Water Assessment Update:

   List land use activities of concern found but not listed in Zone 1 for the original source water assessment.

LUA TYPE	RISK	NAME OF PROPERTY OWNER	OWNER ADDRESS	LATITUDE/LONGITUDE

2. Source Water Protection:

   Does the waterworks have a written source water protection plan? ( ) Yes ( ) No

   If "Yes":

   has the source water protection plan been submitted for review? ( ) Yes ( ) No

   has there been sufficient additional development in the watershed to warrant a revised source water protection plan? ( ) Yes ( ) No

   discuss:

   If "No": Has a schedule been established to develop a plan? ( ) Yes ( ) No

   Discuss:

3. Does waterworks have a spill response plan? ( ) Yes ( ) No

   has it been tested? ( ) Yes ( ) No

4. Has there been a contamination event since last survey (date of evaluation_____)? ( ) Yes ( ) No

   if "Yes", discuss (source, materials and quantities involved, effects on plant and distribution system, etc.) : _____

   _____

   _____

Comments:

APPENDIX C

COMMONWEALTH OF VIRGINIA
DIVISION OF DRINKING WATER
FIELD OFFICE - DISTRICT

WATERWORKS EVALUATION

SURFACE SOURCE
(Equal to or Greater Than 10,000 population served)

** (Waterworks Name) **

PWSID Number _____

conducted ___(date)_____

VDH VIRGINIA DEPARTMENT OF HEALTH
Protecting You and Your Environment

TO:_____ PWSID_____

_____

_____ Subject:_____

Water - _____

WATERWORKS SANITARY SURVEY REPORT(≥10,000)

GENERAL

1. Facility name:_____

2. Facility owned by: _____

3. Address: _____

_____

Contact Person:_____ Title:_____

Telephone: ( )_____

4. Survey by: _____ Time spent on-site:_____

Survey type: _____ Routine _____ Complaint _____ Special

Waterworks type: ____ Community ____ NTNC _____ Transient NC

5. Date of survey: _____ Date memo written: _____

6. Date of last survey: _____/_____/_____

7. Date To D.E._____ Reviewed by: _____Date: _____
Date To D.F.D_____Reviewed by:_____ Date: _____

8. Present at survey: _____

9. Operation Permit No. _____ Effective date: _____

10. Permitted capacity: _____

Operating with in permitted capacity? ( ) Yes ( ) No

Special conditions or restrictions to Operation Permit or Variances or Exemptions issued? ( ) Yes ( ) No
If yes, explain:_____

11. Number of connections: _____ Population served:_____

12. Date of description sheet: _____/_____/_____ Up to date? Yes ( ) No ( )

Inventory/SDWIS records up to date? Yes ( ) No ( )
If either is no, discuss:_____

SUMMARY

Problems Identified at last survey:	Corrected?
1.	Yes
2.	No *
3.	No *

Comments/Recommendations/Necessary Actions:

1. Those items listed above and marked with an asterisk still need to be addressed.

2.

3.

Significant Deficiencies - The following significant deficiencies were noted during the survey. You are required to respond by _____ indicating how and on what schedule the deficiencies will be addressed:

1.

2.

3.

Attachments: ☐ Part A

☐ Part B

☐ Part C

pc/att: _____ Parts ( ) A ( ) B ( ) C
_____ Parts ( ) A ( ) B ( ) C
_____ Parts ( ) A ( ) B ( ) C
_____ Parts ( ) A ( ) B ( ) C for Dental Health

pc: _____Health Department
VDH - Division of Drinking Water
_____
_____

PART A

∃Identifies a Significant Deficiency

A. WATER QUALITY COMPLIANCE MONITORING

Sample Type	Last Sample Date	Next Sample Due Date	Problems or Violations	Samples Collected *
Inorganic				
NO_2/NO_3				
Metals				
Radiological				
VOCs				
SOCs				
Cyanide				
TTHMs				
HAA				
Unregulated Inorganics				
Unregulated Organics				
Lead/Copper				

* Sample Collected Type: 1- compliance 2 - complaint 3 - special investigation

∃1. Does waterworks use certified laboratories? ( ) Yes ( ) **No**
If No, discuss:_____

∃2. Bacteriological sample siting report approved? ( ) Yes ( ) **No** If yes, date approved***:*** ____

∃3. Samples collected in accordance with report? ( ) Yes ( ) **No**

4. Bacteriological samples required per month: _____

5. Notices of bacteriological monitoring noncompliance since last inspection: ( ) Yes ( ) No
(If yes, discuss below)

6. Notices of bacteriological quality noncompliance since last inspection: ( ) Yes ( ) No
(If yes, discuss below)

7. Fluoride split samples up to date? Yes ( ) No ( ) N/A ( )

Comments/Discussion: _____
_____

8. WQP monitoring required? Yes ( ) No ( )
If yes is monitoring satisfactory? Yes ( ) No ( )

∃9. ***Disinfection residuals entering the distribution system meets requirements(0.2 mg/L)?***
Yes ( ) ***No ( )***

∃10. ***Disinfection profile available for review (staff must review).*** Yes ( ) **No** ( )

11. Acceptable Monthly Operation Reports Submitted? Yes ( ) No ( ) . If No , explain:

B. <u>RAPID MIX</u>

1. Number of units: _____ Number in service:_____

2. Type of mixing provided: ( ) conventional ( ) static in-line ( ) other_____

∃3. ***Operable mixer available to meet mixing requirements*** Yes ( ) ***No ( )***

4. Describe operation: -variable speed control operational? Yes ( ) No ( ) NA ( )
-evidence of vortexing? Yes ( ) No ( )
-proper mixing obtained? Yes ( ) No ( )

∃5. ***Required chemicals applied at point(s) of application*:** Yes ( ) ***No ( )***

Chemical Feed Documentation

Chemical Applied	Application Point	Feed Rate

6. Spare mixer provided? Yes ( ) No ( ) NA ( )

7. General performance: ( ) satisfactory ( ) needs attention

8. Physical condition: ( ) satisfactory ( ) needs attention

Comments:

C. FLOCCULATION/SLOW MIX

1. Number of basins:_____ Number in service:_____

2. Mode of operation: ( ) series ( ) parallel ( ) NA

3. All mixers operational? Yes ( ) No ( )

∃4. ***Operable mixers available to meet mixing requirements:*** Yes ( ) ***No ( )***

5. Variable speed control operational? Yes ( ) No ( ) NA ( )

6. Tapered flocculation practiced? Yes ( ) No ( ) NA ( )

7. Isolation of basins possible with continued plant operation? Yes ( ) No ( ) N/A ( )

8. Are proper baffles/compartments provided? Yes ( ) No ( )
   Evidence of vortexing/basin short-circuiting? Yes ( ) No ( )

∃9. ***Overall floc formation***: ( ) satisfactory ( ) needs attention ***( ) undetectable***
   Floc type/appearance: pin floc ( ) fluffy ( ) sweepfloc ( ) other ( )_____

10. Are polymers used? Yes ( ) No ( )

11. Chemical Feed Documentation

Chemical Applied	Application Point	Feed Rate

12. General performance: ( ) satisfactory ( ) needs attention

13. Physical condition: ( ) satisfactory ( ) needs attention

Comments:

D. SEDIMENTATION

1. No. of basins provided: _____ No. in operation: _____

2. Proper flow distributions between basins? Yes ( ) No ( )

3. Signs of short circuiting/overloads? Yes ( ) No ( )

4. Evidence of floc shear at stilling wall? Yes ( ) No ( ) unit effluent? Yes ( ) No ( )

5. Floc carry-over observed? Yes ( ) No ( )

6. Floc settleability: Satisfactory Yes ( ) No ( )
Needs Attention Yes ( ) No ( )

7. Sludge removal: ( ) manual ( ) mechanical

a. Frequency/criteria:_____

b. Last drained/cleaned:_____

∃**c.** ***Excessive sludge accumulation: Yes ( )*** No ( ) If 'yes', estimate sludge blanket depth: _____

8. Chemical Feed Documentation

Chemical Applied	Application Point	Feed Rate

9. General performance: ( ) satisfactory ( ) needs attention

10. Physical condition: ( ) satisfactory ( ) needs attention

Comments:

E. FILTRATION

1. No. of filters provided: _____ No. in operation: _____

2. Filter media: sand ( ) sand/anthracite ( ) other ( )_____

date media last added or changed_____
frequency media depth checked: _____

3. Filtration rate:

Design: _____ mgd at _____ gpm/square foot
Observed: _____ mgd at _____ gpm/square foot
∃ ***Exceeds permitted rate? Yes ( ) No ( )***

Was filtration rate checked? Yes ( ) No ( )
Filter No._____ Rate:_____ gpm/square foot

Frequency operator checks filtration rate:_____
date last checked:_____

4. Filter appurtenances evaluation:

	OPERABLE		GOOD CONDITION		DATE LAST CALIBRATED
∃ ***filter rate-of-flow controls:***	Yes ( )	***No*** ( )	Yes ( )	No ( )	_____
∃ ***backwash pump(s)/controls:***	Yes ( )	***No*** ( )	Yes ( )	No ( )	_____
filter rate-of-flow indicator:	Yes ( )	No ( )	Yes ( )	No ( )	_____
all valves/controls:	Yes ( )	No ( )	Yes ( )	No ( )	_____
loss of head gauges:	Yes ( )	No ( )	Yes ( )	No ( )	_____
backwash rate-of-flow indicator:	Yes ( )	No ( )	Yes ( )	No ( )	_____

5. Filter backwash practices:

∃***Filter backwash based on (plant established maximum values):*** Yes ( ) ***No ( )***

( ) head loss [_____ feet] ( ) time [_____] ( ) turbidity [_____ NTU] ( ) particle counts_____particles/_____ml.:size range _____

Recent history for backwash (over past three months ending_____):

	Maximum	Average
filter run times:	_____ hours	_____ hours
head loss:	_____ feet	_____ feet
turbidity:	_____ NTU	_____ NTU
particle count:	_____	_____

Filter backwash observed? Yes ( ) No ( )
Satisfactory? Yes ( ) No ( ) NA ( )

Frequency operator checks backwash rate:_____
date last checked:_____

Criteria used to stop backwash:_____
typical backwash duration:_____

Frequency operator checks filter bed expansion:_____
date last checked:_____

6. Does plant practice filter-to-waste after backwash?: ( ) Yes ( ) No ( ) NA

criteria established for filter-to-waste: duration
_____
_____
average filter-to-waste time:_____
is turbidity monitored during filter to waste procedure? ( ) Yes ( ) No
are particles counted/monitored during procedure? ( ) Yes ( ) No
is filter to waste at design filtration rate? ( ) Yes ( ) No

7. Is filter backwashed after any/all shutdowns? ( ) Yes ( ) No
if no, does operator start filter with filter-to-waste after filter has been idle, before delivering flows to system? ( ) Yes ( ) No

8. Surface wash provided: ( ) Yes ( ) No Operable? ( )Yes ( ) No
backflow preventer provided? ( ) Yes ( ) No ( ) NA

9. Air wash provided: ( ) Yes ( ) No Operable? ( )Yes ( ) No

10. General performance: ( ) satisfactory ( ) needs attention

11. Physical condition: ( ) satisfactory ( ) needs attention

12. Chemical Feed Documentation

Chemical Applied	Application Point	Feed Rate

Comments:

F. FINISHED WATER FACILITIES

1. Clear well

∃	***access protected from contamination***	( ) Yes ***( ) No***
∃	***overflow protected from contamination***	( ) Yes ***( ) No***
	adequate drain	( ) Yes ( ) No
∃	***screened vent(s)***	( ) Yes ***( ) No***
∃	***watertight roof/cover***	( ) Yes ***( ) No***
	hatch(s) secure	( ) Yes ( ) No
	viewing port with light	( ) Yes ( ) No
	sediment present	( ) Yes ( ) No
	last cleaned:	_____

Physical condition: ( ) satisfactory ( ) needs attention

2. Finished water pumps: ( ) NA

number of pumps provided:	_____
number of pumps operable:	_____
number of pumps in use:	_____
pressure gauges provided/operable	( ) Yes ( ) No
flow meter operable	( ) Yes ( ) No
pumping rate:	_____ gpm/mgd

Physical condition: ( ) satisfactory ( ) needs attention

3. Is clearwell water level monitored/controlled? ( ) Yes ( ) No ( ) NA

4. Are level sensors operable? ( ) Yes ( ) No ( ) NA

5. Chemical Feed Documentation

Chemical Applied	Application Point	Feed Rate

6. Approved backflow device to isolate process water at treatment plant from distribution system?
( ) Yes ( ) No

Comments:

G. WASTE HANDLING

1. Backwash, filter-to-waste, and/or settling basin wastewaters discharged to:
   ( ) lagoons
   ( ) holding tank/sand beds
   ( ) other_____

2. Ultimate discharge of waste flows:_____

3. Provisions for waste recycle to head of plant? ( ) Yes ( ) No
   Is waste recycle practiced? ( ) Yes ( ) No
   Is recycle stream monitored? ( ) Yes ( ) No If Yes, what is monitored?_____

   Is approved treatment provided for recycle flows? ( ) Yes ***( ) No***
   VDH approval date: _____
   If yes, describe.

   Are floor drains in chemical storage and feed areas separated from process waste flow streams?
   ( ) Yes ( ) No

Comments:

H. CHEMICAL FEED FACILITIES

1. The following chemicals are fed at this facility:

( ) alum	( ) pre-soda ash	( ) pre-chlorine	( ) ammonia
( ) ferric salt	( ) post-soda ash	( ) post-chlorine	( ) chlorine dioxide
( ) ferrous salt	( ) carbon	( ) $KMnO_4$	( ) filter aid
( ) pre-lime	( ) fluoride _____		
( ) post-lime	( ) corrosion inhibitor _____		
( ) other(s) _____			

   Chemicals certified to meet NSF Standard 60? Yes ( ) No ( )

2. All feeders in good condition? Yes ( ) No ( )

3. Adequate ventilation provided? Yes ( ) No ( )

4. Spare feeders provided where needed? Yes ( ) No ( )

5. Adequate backflow prevention on solution water? Yes ( ) No ( )

   anti-siphon devices on feed lines? Yes ( ) No ( )

6. Feeders calibrated on a regular basis? Yes ( ) No ( )

   frequency operators calibrate feeders: _____
   date last calibrated: _____

   frequency operators check calibrations: _____
   date last checked: _____

   Adequate Chemical Storage area provided
   (space, spill prevention)? Yes ( ) No ( )

7. Chlorination/chlorine feed appurtenances:

   adequate ventilation Yes( ) No( )
   cylinders chained Yes( ) No( ) NA( )
   panic hardware Yes( ) No( ) NA( )
   cylinder repair kit Yes( ) No( ) NA( )
   chlorine scales operable Yes( ) No( ) NA( )
   automatic change-over provided/operable Yes( ) No( ) NA( )
   vent properly installed/screened Yes( ) No( ) NA( )
   leak detection (type:_____) Yes( ) No( )
   outside entrance/exit Yes( ) No( )
   room gas-tight, floor drains sealed Yes( ) No( )

8. Fluoridation/fluoride feed appurtenances:
   scales provided and in good operating condition Yes ( ) No ( ) NA ( )
   water meter/fluoride feed pacer/other control system provided, in good operating condition Yes ( ) No ( ) NA ( )
   anti-siphon protection on all feed lines Yes ( ) No ( ) NA ( )
   fluoride chemical storage satisfactory Yes ( ) No ( ) NA ( )
   water softener provided and in good operating condition Yes ( ) No ( ) NA ( )
   softener effluent hardness maintained <75 mg/l Yes ( ) No ( ) NA ( )

9. Is corrosion control practiced at this facility: Yes ( ) No ( )
   if yes, indicate method(s):
   ( ) pH/alkalinity adjustment
   ( ) corrosion inhibitor
   ( ) other_____

10. Physical condition of chemical feed facilities: ( ) satisfactory ( ) needs attention

11. Adequate safety equipment provided for chemical handling (i.e., rubber gloves, breathing apparatus, goggles, aprons, etc.)? Yes ( ) No ( )

∃12. ***Do any of the chemical storage or handling facilities offer potential for explosions?***
Yes ( ) No ( )

13. Other safety problems for the operators or public noted? Yes ( ) No ( ) Describe _____

Comments:

I. OPERATIONAL/PERFORMANCE DATA

1. At time of survey

Test run	RAW Frequency/ Results	APPLIED Frequency/ Results	FINISHED Frequency/ Results
Turbidity			
pH			
Hardness			
Alkalinity			
Temperature			
Free Cl_2			
Fluoride			
Iron			
Manganese			

Other			

Note: * = performance of this test was observed.

Plant flow at time of inspection:
Raw water _____
Finished water _____

2. Chemical Dosages:

primary coag. _____ @ ____ mg/l
pre-pH/alk _____ @ ____ mg/l
post-pH/alk _____ @ ____ mg/l
pre-chlorine _____ lb/day or mg/l
post-chlorine _____ lb/day or mg/l
others _____ @ ____ mg/l
_____ @ ____ mg/l
_____ @ ____ mg/l

3. Range of turbidity values for individual filter effluents:
_____ NTU to _____ NTU

Comments:

J. LABORATORY/STAFF MONITORING PROCEDURES

1. Following equipment provided and in good condition?

turbidimeter Yes ( ) No ( )
pH meter Yes ( ) No ( )
jar test machine Yes ( ) No ( )
Zeta meter Yes ( ) No ( ) NA ( )
pilot filters Yes ( ) No ( ) NA ( )
streaming current monitor Yes ( ) No ( ) NA ( )
particle counter/monitor Yes ( ) No ( ) NA ( )
If yes, locations monitored _____

2. Are adequate equipment and reagents available to run
   - necessary operational tests? Yes ( ) No ( )
   - are reagents dated? Yes ( ) No ( )
   - reagents out of date? Yes ( ) No ( )
   - are test procedures appropriate? Yes ( ) No ( )
   - are desk-top units calibrated at appropriate intervals? Yes ( ) No ( )

3. Fluoride test utilized: _____
   - equipment in good condition? Yes ( ) No ( ) NA ( )
   - standards up-to-date? Yes ( ) No ( ) NA ( )

4. Is continuous pH monitoring equipment provided and in good condition? Yes ( ) No ( ) NA ( )
   - do continuous monitor readings correspond to desk-top readings? Yes ( ) No ( ) N/A ( )
   - Frequency of continuous monitoring unit calibration: _____

5. Does plant have laboratory capability for:
   - algae counts and identification? Yes ( ) No ( )
   - threshold odor determinations? Yes ( ) No ( )
   - iron and manganese analyses? Yes ( ) No ( )

6. Adequate backflow prevention devices at sinks, etc. Yes ( ) No ( )

∃7. ***Is a daily log/data sheet maintained?*** Yes ( ) ***No ( )***
   - Were these daily log/data sheets reviewed? Yes ( ) No ( )
   - Are the daily log/data sheets adequate? Yes ( ) No ( )
   - Is the frequency of operational data collection adequate? Yes ( ) No ( )
   - Are there any obvious problems noted from the log entries? Yes ( ) No ( )
   - Are changes in operating conditions noted? Yes ( ) No ( )

K. OPERATING STAFF

1. Water treatment plant classification: I ( ) II ( ) III ( ) IV ( )

2. Operator in responsible charge (OIRC): _____
   License number: _____ Class: _____

3. Is OIRC ( ) on staff ( ) on contract ( ) other _____

4. List Name, Class and License Numbers of other operating staff (shift supervisors, etc.):

5. How are plant operating decisions made and communicated?_____
_____
_____

6. Hours plant is operated per day: _____

Hours per day OIRC is present: _____

7. Are there criteria and procedures established for plant shut down in case of unit process failure or upset or in event of significant overall quality degradation? ( ) Yes ( ) No

Comments:

L. OPERATIONAL STAFF MONITORING PROCEDURES

∃1. ***Is a daily log/data sheet maintained?*** ( ) Yes ***( ) No***
Were these daily log/data sheets reviewed? ( ) Yes ( ) No
Are the daily log/data sheets adequate? ( ) Yes ( ) No
Is the frequency of operational data collection adequate? ( ) Yes ( ) No
Are there any obvious problems noted from the log entries? ( ) Yes ( ) No

2. How is the coagulation process controlled?
( ) Pilot Filter ( ) Jar Tests
( ) Zeta Meter ( ) Streaming Current Monitor
Were coagulation control procedures observed/discussed? ( ) Yes ( ) No
Were the procedures adequate? ( ) Yes ( ) No

3. Turbidity Monitoring:
A. What is the frequency of the representative (combined) filter effluent turbidity monitoring?
( ) _____ times per shift ( ) continuous

Is this frequency adequate (at least every 4 hours)? ( ) Yes ( ) No

Are continuous turbidity monitoring units provided and in good condition? ( ) Yes ( ) No

B. Does each filter effluent have an individual continuous turbidity monitor? ( ) Yes ( ) No

Does the filter effluent turbidity monitoring system have alarm set points?( ) Yes ( ) No ( ) N/A
Alarm set point(s):_____Alarm type:audio,visual,other:_____

Is data recorded at least every 15 minutes? ( ) Yes ( ) No

C. Desk-top turbidimeter manufacturer:_____ model no._____

date last calibrated:	_____
calibration date posted:	( ) Yes ( ) No
date bulb last changed:	_____
spare bulb on hand:	( ) Yes ( ) No
condition of cuvettes:	_____
primary standard used:	( ) Amco AEPA-1 ( ) Formazin ( )Stablcal
expiration date of primary standard:	_____
secondary standard used:	_____
expiration date of secondary standard:	_____
date secondary last compared to primary:	_____
turbidity-free water available:	( ) Yes ( ) No

do continuous monitor readings correspond to desk-top unit readings? ( ) Yes ( ) No ( ) NA

4. Method of chlorine residual compliance monitoring: _____

Continuous residual monitor operational?( ) Yes ( ) No
Has operable alarm? ( )Yes ( ) No

Free chlorine residual measured and reported? ( ) Yes ( ) No

5. Chlorine residual necessary to meet CT requirements:

_____mg/l free chlorine as measured at _____

Is staff aware of the required minimum residual? ( ) Yes ( ) No

∃ ***Is this concentration being continuously met?*** ( ) Yes ***( ) No***

if "No", is staff checking other parameters (pH, temperatures, clearwell levels, etc.) and taking appropriate steps to ensure that CT requirements are being met on a continuous basis? ( ) Yes ( ) No

6. Overall appearance of laboratory: ( ) satisfactory ( ) needs attention

Comments:

PART B

∃Identifies a Significant Deficiency

A. RAW WATER INTAKE/SOURCE EVALUATION

Source Name: _____

1. Intake located on: ( ) stream ( ) reservoir

2. Observed (visible) water quality:

   ( ) clear ( ) turbid
   ( ) colored _____ ( ) other _____

3. Activities or pollution sources in the immediate source water area (under waterworks control) that represent significant/acute health risk: ( ) Yes ( ) No
   Describe**:** _____

4. Has there been a contamination event since last evaluation (date of evaluation ___)? ( ) Yes ( ) No

   If "Yes", discuss: _____
   _____

5. Reservoir level/stream flow: ( ) normal ( ) high ( ) low

6. For in-stream intake:

   check dam provided: ( ) Yes ( ) No
   condition of check dam: _____
   stream flow rate monitoring provided: ( ) Yes ( ) No

7. Condition of intake structure:_____

   screen provided: ( ) manual ( ) mechanical ( ) none
   condition of screen: ( ) satisfactory ( ) needs attention
   method of cleaning screen: _____
   if mechanical, is it operable/used: _____
   number of intake levels provided: _____ depths:_____
   drawoff depth/level being used: _____
   access provided to intake structure: _____

8. Raw water pumps

number provided:_____ number operable:_____
number in use: _____ pumping rate: _____

∃***Present water demand exceeds pumping rate?*** ***( ) Yes*** ( ) No

pump station subject to flooding: ( ) Yes ( ) No
protected against trespassing/vandalism: ( ) Yes ( ) No
access road to pump station maintained ? ( ) Yes ( ) No
when were pumps/valves last maintained/checked:_____

9. Treatment provided at intake (describe): _____
_____

10. Physical condition of intake: ( ) satisfactory ( ) needs attention

∃***Intake components restrict ability of the waterworks to meet present demand? ( ) Yes*** ( ) No

∃11. ***Present water demand exceeds source yield? ( ) Yes ( ) No***

Comments:

B. DISTRIBUTION SYSTEM EVALUATION

1. Distribution System Survey

   a. Map of distribution system available ( ) Yes ( ) No
   frequency of map updates: _____

   b. Materials used:
   ( ) ductile iron ( ) cast iron
   ( ) asbestos cement ( ) galvanized
   ( ) PVC ( ) other plastic _____
   ( ) other(s)_____

   c. Valve guide available ( ) Yes ( ) No

2. Piping System Maintenance

   a. Water audit conducted ( ) Yes ( ) No
   accountability determined? ( ) Yes ( ) No
   if yes, _____% accountability
   systematic leak detection program ( ) Yes ( ) No
   systematic leak repair program ( ) Yes ( ) No
   meter repair program ( ) Yes ( ) No
   records maintained ( ) Yes ( ) No

   b. Distribution system routinely flushed ( ) Yes ( ) No
   frequency: _____
   records maintained ( ) Yes ( ) No

   c. Fire hydrants
   operational status checked ( ) Yes ( ) No
   by whom: _____
   frequency:_____
   records maintained ( ) Yes ( ) No
   flow tested ( ) Yes ( ) No
   flow coded ( ) Yes ( ) No

   d. Valve exercise program
   valves checked for operability ( ) Yes ( ) No
   frequency:_____
   records maintained ( ) Yes ( ) No

e. Corrosion control program
piping conditions examined ( ) Yes ( ) No
water stability determined ( ) Yes ( ) No
method:_____ frequency:_____
other corrosivity/corrosion control tests performed
method:_____ frequency:_____

f. Air/vacuum valves
checked for operability ( ) Yes ( ) No
frequency: _____
protected from contamination ( ) Yes ( ) No

3. Distribution system problems

a. problems/complaints logged by owner
in past year ( ) Yes ( ) No
( ) taste & odor
( ) discolored water/sediment in water
∃***( ) pressure problems (<20 psi at peak flow)***
( ) service interruptions
( ) other _____

b. records kept for three years ( ) Yes ( ) No

∃ c. ***leakage rates > 30% (poses unacceptable risk of back siphonage) ( ) Yes*** ( ) No

discuss problem(s), resolution:

4. Water quality and compliance monitoring

a. Pb/Cu monitoring materials survey approved/date _____ ( ) Yes ( ) No
Samples collected in accordance with approved plan ( ) Yes ( ) No

b. Chlorine residual analyses
( ) free ( ) total
method:_____
number of locations:_____
frequency of monitoring:_____
minimum residual measured:_____

c. Heterotrophic Plate Counts ( ) Yes ( ) No
number of locations:_____

frequency of monitoring:_____
maximum count:_____

d. Total Trihalomethanes ( ) Yes ( ) No
number sample sites:_____
sample locations representative of:
maximum residence time (25%) ( ) Yes ( ) No
normal population spread ( ) Yes ( ) No
and system residence time

e. Turbidity analyses ( ) Yes ( ) No
locations representative ( ) Yes ( ) No

f. Records management for above monitoring
records maintained for 3 years ( ) Yes ( ) No
sampling locations marked on map ( ) Yes ( ) No

5. Is rechlorination practiced? ( ) Yes ( ) No

Type of equipment _____

adequate ventilation	Yes( ) No( )
cylinders chained	Yes( ) No( ) NA( )
panic hardware	Yes( ) No( ) NA( )
cylinder repair kit	Yes( ) No( ) NA( )
chlorine scales operable	Yes( ) No( ) NA( )
automatic change-over provided/operable	Yes( ) No( ) NA( )
vent properly installed/screened	Yes( ) No( ) NA( )
leak detection (type:_____)	Yes( ) No( )
outside entrance/exit	Yes( ) No( )
room gas-tight, floor drains sealed	Yes( ) No( )

Comments:

C. CROSS CONNECTION CONTROL PROGRAM

∃1. ***Does utility/plant have an approved Cross-Connection Control Program?*** ( ) Yes ***( ) No***
date of approval:_____
person in responsible charge:_____

2. Periodic inspections/surveys made in accordance with the approved program? ( ) Yes ( ) No

3. Backflow prevention devices tested in accordance with the approved program? ( ) Yes ( ) No

4. All booster/jockey/fire pumps in system equipped with low pressure cut-off switches on suction lines? ( ) Yes ( ) No
are the cut-off switches tested? ( ) Yes ( ) No

5. Are inspection/test records maintained? ( ) Yes ( ) No
location:_____
records maintained for 10 years? ( ) Yes ( ) No
were records reviewed? ( ) Yes ( ) No
are records satisfactory? ( ) Yes ( ) No

Comments:

D. Distribution Storage **PWSID _____**

STORAGE TANK NAME				
A. WATER QUALITY PROTECTION				
∃**1.** ***Structure Watertight***				
∃***2. Vent Shielded and Screened***				
3. Drain Satisfactory				
4. Tank Overflow				
∃ ***a. Screened***				
b. Surface Air Gap Provided				
c. Splashpad/Erosion				
5. Access:				
∃a. Roof Hatch Watertight				
∃b. Sidewall Access Watertight				
c. Accesses Locked/Bolted				
6. Other Tank Openings				
a. Curbed and Sleeved				
b. Covered				
7. Maintenance/Repair Date				
8. Last Date of Professional Tank Survey(recommend~5yr)				
∃9. Tank(s) Appears Structurally Sound? (Discuss in "Comments" below)				
10. Properly modified for Antennae?				
B. WATER QUALITY MAINTENANCE				
1. Sample Tap Available				
2. Frequency Samples Collected				
3. Floating Debris Observed				
4. Good Turnover Potential				
5. Flushed/Cleaned Date				
C. OPERATION				
1. Tank Level Controls Operable				
a. Automatic				
b. Manual				
2. Tank Level Recorded				
3. Automatic Recorder Operable				
D. CORROSION CONTROL				
1. Routine Interior Inspections Scheduled				
2. Interior Corrosion Visible				
3. Exterior Corrision Visible				
4. Cathodic Protection Operable				
E. SAFETY				
1. Interior/Exterior Ladder Condition				
2. Interior/Exterior Ladder Guard				
3. Adequate Railing Available				
4. Safety Belt Available				
F. LOT				
1. Upkeep				
2. Access Road Maintained				
3. Surface Water Diverted				
4. Fence Condition Good				
5. Access Locked				

Y=YES; N=NO; N/A=NOT APPLICABLE; N/1=NOT INSPECTED; NON=NONE; OK-ACCEPTABLE

COMMENTS: _____
_____

E. Distribution Pump Station **PWSID _____**

PUMP STATION NAME				
A. PUMP STATION LOT				
1. Upkeep Adequate				
2. Surface Water Diverted Away				
3. Access Road Maintained				
B. PUMP STATION BUILDING				
1. Light Operable				
2. Ventilation Operable				
3. Heating Operable				
4. Pump Gland Piped to Drain				
5. Concrete Floor				
6. Screened Floor Drain				
7. Locked				
8. Deterioration &/or Damage Evident				
∃9. ***Storage of toxic chemicals***				
C. PUMP STATION OPERATIONS				
1. No. of Pumps				
2. All Operable				
3. Pump Controls:				
a. Automatic				
b. Manual				
4. Pump Alternation:				
a. Automatic				
b. Manual				
5. Flow Meter Operable				
6. Low Pressure Cut-off				
7. Alarm Operable				
8. Compound Gauges Operable				
∃9. ***Cross Connections are present***				
D. PUMP MAINTENANCE				
1. Pump Service Schedule				
2. Pump Service Recorded				
3. Discharge Gate Valve				
4. Suction Gate Valve				
5. Check Valve				
E. HYDROPNEUMATIC TANKS				
1. Pressure Gauge				
2. Pressurizing System				
3. Pressure Operating Range				
4. Sight Gauge				
5. Drain				
6. Pressure Relief Valve				
7. Vacuum Relief Valve				
8. Exterior Condition				
9. Dept.of Labor & Industry Date(>120 gal)				
10. Normal Pump Cycling				

Y=YES; N=NO; N/A=NOT APPLICABLE; N/I=NOT INSPECTED; NON=NONE; OK=ACCEPTABLE
Items repaired/replaced since last inspection: _____
_____
Comments: _____

SUPPLEMENTAL AND USEFUL WORKSHEETS

(the use of these worksheets is optional)
(attach these to report if used during survey)

1. Jar Test Results

5. Filter Drop Test Results

3. Other pages as developed and appropriate

Jar Test Results

Plant: _____

Date: _____

Performed By: _____

Raw Water Characteristics:

pH _____
Temperature _____ ^{0}F
Turbidity _____ NTU (Turb.)
Alkalinity _____ (mg/L as $CaCO_3$) (Alk.)
Total Hardness _____ (mg/L as $CaCO_3$) (TH)

Jar No.	Coag. Dose (mg/L)	Alk. Adj. (mg/L)	Floc Forming	Floc Settling Charac.	Settled pH	Settled Alk.	Settled TH	Settled Turb.
1								
2								
3								
4								
5								
6								

Coagulant Used: _____ Alkalinity Adjustment: _____

_____ RPM for _____ minutes; _____ RPM for _____ minutes; _____ RPM for _____ minutes

Settling Time: _____ minutes

Filter Drop Test Results

Plant: _____

Date: _____

Inspected By: _____

No. of Filters: _____

Filter Box Area: _____

Gullet Area: _____

Effective Filter Surface Area: _____

Volume Filtered: _____

Filter No.	Time For 6" Drop	Calc. Filter Rate	Indicated Filter Rate	Head Loss Indicated	Head Loss Measured

PART C

∃Identifies a Significant Deficiency

A. SYSTEM MANAGEMENT AND ADMINISTRATION

1. Is the system's management familiar with the system's facilities and their needs? ( ) Yes ( ) No

2. Do managers have clear lines of communication established with plant and system operational staff? ( ) Yes ( ) No

3. Are operational policies clearly set forth and communicated/made available to operating staff? ( ) Yes ( ) No

4. Has an Operations & Maintenance Manual been prepared for the plant and system? ( ) Yes ( ) No
   is the manual kept up-to-date? ( ) Yes ( ) No

5. Does good communications flow exist between the Operator In Responsible Charge and other operating staff (particularly shift supervisors)? ( ) Yes ( ) No

6. Are shift supervisors held responsible for all decisions made while on duty? ( ) Yes ( ) No

7. Do Operator in Responsible Charge and shift supervisors have 24-hour access to management staff capable of authorizing emergency expenditures? ( ) Yes ( ) No

8. Has an emergency operations plan been established? ( ) Yes ( ) No
   has the plan been tested? ( ) Yes ( ) No
   is the plant equipped with an emergency power generator capable of powering plant at average flow? ( ) Yes ( ) No
   other provisions for continuous operability ( ) Yes ( ) No

9. Are procedures established to notify customers of health advisories, water conservation restrictions, or other emergencies? ( ) Yes ( ) No

∃10. ***Does current staffing meet regulatory requirements (for both numbers and classes)?*** ( )Yes ***( ) No***

   Are sufficient staff (plant, system, and laboratory) provided? ( )Yes ( ) No
   Will system be adequately staffed in case of illness or vacation? ( ) Yes ( ) No

11. Are personnel adequately trained? ( ) Yes ( ) No

12. Is there an active, on-going staff training program, either in-house or outside? ( ) Yes ( ) No

13. Are there problems with personnel turnover? ( ) Yes ( ) No

14. Does management have plans for addressing system growth or regulatory requirements for improvements? ( ) Yes ( ) No

15. Are sufficient funds allocated for system maintenance and upkeep? ( ) Yes ( ) No

Is a sinking fund established to cover necessary replacements (or system expansion/improvement)? ( ) Yes ( ) No

16. Is there an established safety program? ( ) Yes ( ) No

17. Are preventative maintenance tasks scheduled and performed? ( ) Yes ( ) No

18. Has the system completed the public notification required by the Lead Contamination Control Act? ( ) Yes ( ) No

delivered how:_____ when:_____
documentation given to DDW: ( ) Yes/when_____ ( ) No

are new connections to the system notified? ( ) Yes ( ) No

19. If Notices of Violation for monitoring, Maximum Contaminant Level exceedance, or other problems have been issued to the waterworks, has public notification been accomplished properly and promptly? ( ) Yes ( ) No

Are new connections to the system notified of current or unresolved problems? ( ) Yes ( ) No

20. Consumer Confidence Report: Was report issued for last applicable calendar year? ( ) Yes ( ) No
Was report information correct? ( ) Yes ( ) No
Was certification statement received? ( ) Yes ( ) No

Comments:

B. SOURCE WATER ASSESSMENT/ PROTECTION

1. Source Water Assessment Update:

List land use activities of concern found but not listed in Zone 1 for the original source water assessment.

LUA TYPE	RISK	NAME OF PROPERTY OWNER	OWNER ADDRESS	LATITUDE/LONGITUDE

2. Source Water Protection:

Does the waterworks have a written source water protection plan? ( ) Yes ( ) No

If "Yes":

has the source water protection plan been submitted for review? ( ) Yes ( ) No

has there been sufficient additional development in the watershed to warrant a revised source water protection plan? ( ) Yes ( ) No

discuss:

If "No": Has a schedule been established to develop a plan? ( ) Yes ( ) No

Discuss:

3. Does waterworks have a spill response plan? ( ) Yes ( ) No

has it been tested? ( ) Yes ( ) No

4. Has there been a contamination event since last survey (date of evaluation_____)? ( ) Yes ( ) No

if "Yes", discuss (source, materials and quantities involved, effects on plant and distribution system, etc.) : _____

_____

_____

Comments:

APPENDIX D

(FO Letterhead)

SUBJECT: _____
Water - _____

_____
_____
_____
_____

Dear _____:

On _____, I made a sanitary survey of your waterworks. Enclosed is a copy of the report developed as a result of that survey.

Major items of concern or which need attention or clarification are discussed on page 2 of the cover section. Additional items may be found in the body of the report. [Your attention is directed to the Significant Deficiencies listed on Page Two. You are required to respond by _____ indicating how and on what schedule the deficiencies will be addressed. (Optional for $\geq$10,000)].

If you have questions on the report or would like to discuss my findings, please do not hesitate to contact me.

Sincerely,

__(name)_____
__(title)_____

enclosure: Report of Sanitary Survey

pc or pc/enc as appropriate